

SIGNIFICANT NASA INVENTIONS

Available for Licensing in Foreign Countries

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**National Aeronautics and Space Administration
Washington, D.C., U.S.A.**

1974

PREFACE

NASA FOREIGN PATENT LICENSING PROGRAM

GENERAL

The foreign licensing program of the National Aeronautics and Space Administration serves to promote and utilize foreign patent rights vested in the Administration. The objective of this program is to extend the patent coverage on valuable NASA-owned inventions to various foreign countries in order to further the interests of United States industry in foreign commerce, to enhance the economic interests of the United States, and to advance the international relationships of the United States.

WHERE TO DIRECT INQUIRIES REGARDING INVENTIONS

Listed in this booklet are abstracts of various NASA-owned inventions which are available for foreign licensing in the identified countries in accordance with the NASA Foreign Patent Licensing Regulations, published on August 18, 1966, in 31 Federal Register 10958-10959, now 14 CFR 1245.400 et seq., and are reproduced on page 1. Requests for additional information of the invention or information regarding applications for license for a specific invention should be directed to the NASA field installation address printed on the page on which the invention appears. Please be sure to include the title and NASA Case Number of the invention when making your inquiries.

NEGOTIATION OF LICENSES

Licenses will be individually negotiated and may be granted to any applicant, foreign or domestic, on a nonexclusive or exclusive basis for royalties or other considerations and on such other terms and conditions as are deemed appropriate to the interests of the United States. Preference in the granting of foreign license rights will be shown to those applicants who have previously been granted a license under the corresponding U.S. patent or patent application.

TO OBTAIN COPIES OF PATENTS

This publication includes abstracts of those inventions in which NASA owns the principal or exclusive rights and which have been made available for patent licensing in the countries indicated. The corresponding U.S. patent number is also listed. Copies of the U.S. patents may be purchased directly from the U.S. Patent Office, Washington, D.C. 20231 for fifty cents a copy. Some of these inventions have been licensed by NASA in one or more of the indicated countries.

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TITLE 14—AERONAUTICS AND SPACE

Chapter V—National Aeronautics and Space Administration

PART 1245—PATENTS

Subpart 4—Foreign Patent Licensing Regulations

New Subpart 4 is added:

Subpart 4—Foreign Patent Licensing Regulations

Sec.

- 1245.400 Scope of subpart.
- 1245.401 Policy.
- 1245.402 Types of licenses and terms and conditions.
- 1245.403 Government license.
- 1245.404 Enforcement of patent rights.
- 1245.405 Procedures.

AUTHORITY: The provisions of this Subpart 4 issued under 42 U.S.C. 2457 (g) and (h).

§ 1245.400 Scope of subpart.

(a) The subpart establishes the policy, terms, conditions, and procedures under which NASA-owned foreign patents and patent applications may be licensed.

(b) The provisions of this subpart apply to all NASA-owned patents granted in countries other than the United States and to NASA-owned patent applications pending in such countries and supplement the provisions of Subpart 2 of this part for foreign patent licensing.

§ 1245.401 Policy.

The foreign licensing program of the National Aeronautics and Space Administration serves to promote and utilize foreign patent rights vested in the Administration. The objectives of this program are to further the interests of United States industry in foreign commerce, to enhance the economic interests of the United States, and to advance the international relationships of the United States.

§ 1245.402 Types of licenses and terms and conditions.

Licenses will be individually negotiated and may be granted to any applicant, foreign or domestic, on a nonexclusive or exclusive basis for royalties or other considerations and on such other terms and conditions as are deemed appropriate to the interests of the United States. Preference in the granting of foreign license rights will be shown to those applicants who have previously been granted a license under the corresponding U.S. patent or patent application.

§ 1245.403 Government license.

There will be reserved from each exclusive license an irrevocable, nonexclusive, nontransferable, royalty-free license for the practice of such invention throughout the world by or on behalf of the United States or any foreign government pursuant to any existing or future treaty or agreement with the United States.

§ 1245.404 Enforcement of patent rights.

An exclusive licensee will be authorized to enforce the licensed patent and to sue infringers of the patent at its own expense.

§ 1245.405 Procedures.

(a) NASA will publish in the United States, and elsewhere as may be appropriate, lists of NASA-owned foreign patents or patent applications available for licensing.

(b) NASA will also furnish written notice of the availability for licensing of NASA-owned foreign patents or patent applications to any licensee under the corresponding U.S. patent or patent application.

(c) Applications for license should be addressed to the Administrator, National Aeronautics and Space Administration, Washington, D.C. 20456. The application must fully identify the patent or patent application, and state the type of license requested together with proposed terms and conditions thereof.

(d) The conduct of negotiations with prospective licensees will be the responsibility of the General Counsel, NASA. In the conduct of such negotiations, due regard shall be had for the possible interests of NASA program and staff offices, and their coordination will be obtained as deemed appropriate.

(e) NASA will publish notice in the FEDERAL REGISTER, and elsewhere as may be appropriate, of its intention to grant an exclusive license under an identified patent or patent application. An exclusive license will not be granted until the expiration of 60 days from the date of notice in order to provide a suitable time interval for interested persons or other Government agencies to interpose comment or objection.

(f) All licenses shall become effective upon the written acceptance by the licensee of a license instrument specifying the type of license and terms and conditions thereof.

Effective date. The provisions of this Subpart 4 are effective upon publication in the FEDERAL REGISTER.

JAMES E. WEBB,
Administrator.

[F.R. Doc. 66-8920; Filed, Aug. 17, 1966; 8:45 a.m.]

FEDERAL REGISTER, VOL. 31, NO. 160--THURSDAY, AUGUST 18, 1966

SYSTEM FOR RECORDING AND REPRODUCING PULSE CODE MODULATED DATA

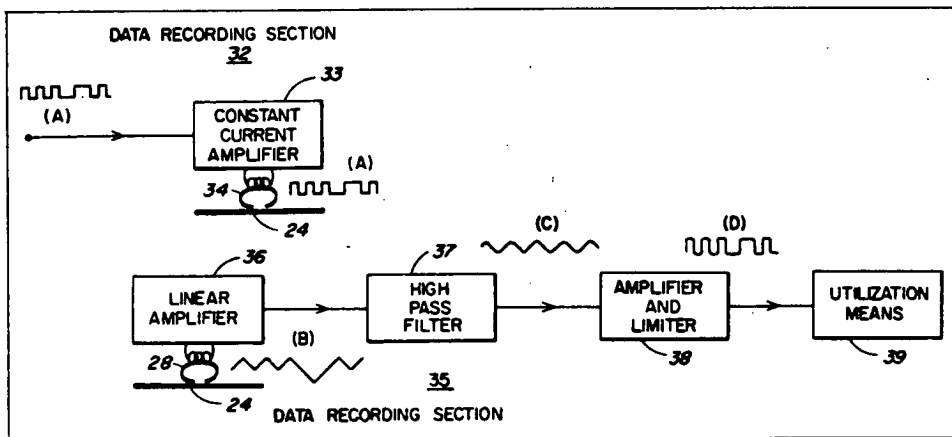
NASA Case No. XGS-01021

Canada

Address inquiries to:
Goddard Space Flight Center
Attn: Patent Counsel
Mail Code: 204
Greenbelt, MD 20771
U.S.A.

[Corresponding to U.S. Patent No. 3,277,373]

In pulse code modulated magnetic tape recording and reproducing (playback) systems, the playback head tends to alter the shape of the recorded signal. Accordingly, the reproducing system must reconstruct the proper signal from the altered one. This invention eliminates the need for this reconstruction function by the design of the playback head in which the head gap is approximately one-half the wave length of the recorded pulse code modulated data at its fundamental pulse repetition frequency. The playback head thus provides an output signal which is an integral of the recorded signal and contains all of the recorded information. The invention also allows a higher packing density of the recorded information on the magnetic tape.



LIGHT DETECTION SYSTEM

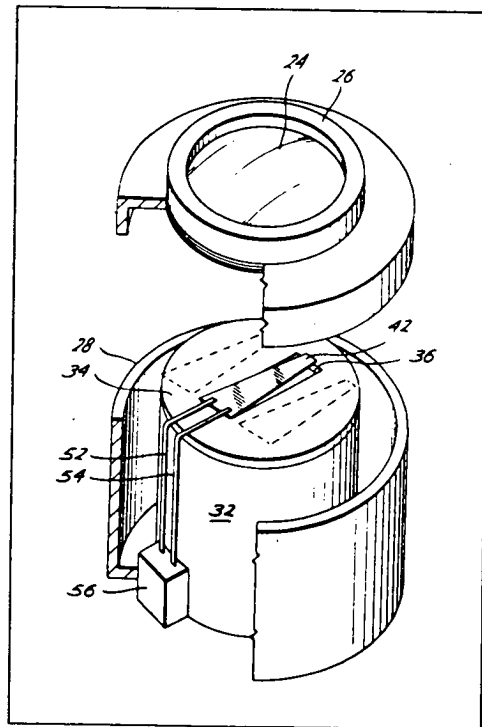
NASA Case No. XNP-01059

Canada

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Mail Code: 180-601
4800 Oak Grove Drive
Pasadena, CA 91103
U.S.A.

[Corresponding to U.S. Patent No. 3,354,320]

A system for determining the position of a light source about two axes of a reference position. The system, originally developed for orienting antenna on the Mariner spacecraft, utilizes a single movable part, a vibrating reed shutter, for alternately blocking and passing light from the source projected onto a photosensitive detector at the position of reference.



INTERCONNECTION OF SOLAR CELLS

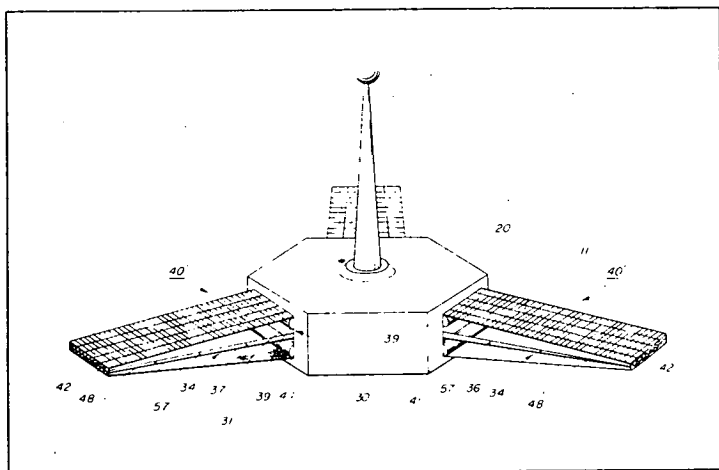
NASA Case No. XGS-01475

Australia, Belgium, Canada,
France, Netherlands, Italy,
Japan, Great Britain,
West Germany

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Goddard Space Flight Center
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U.S.A.

[Corresponding to U.S. Patent No. 3,459,391]

Expanded metal, that is, a thin metal strip which has first had short longitudinal cuts made therein and then been pulled transverse to the cuts to open the cuts into diamond shaped holes, has been used as interconnectors in a solar cell matrix to provide a flexible, somewhat resilient array. The solar cell array can be compactly stored prior to deployment and then deployed into a variety of shapes through the use of a new expandable frame in which telescoping tubes are extended to a desired length and then cemented to form a rigid support structure.



*Exclusively licensed in Japan.

BALANCED BELLOWS SPIROMETER

NASA Case No. XAC-01547

Canada

Address inquiries to:

Ames Research Center

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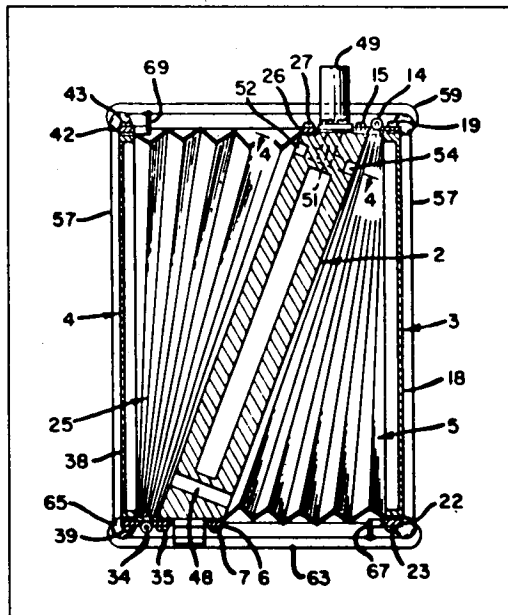
Mail Code: 200-11A

Moffett Field, CA 94035

U.S.A.

[Corresponding to U.S. Patent No. 3,420,225]

A laboratory instrument for measuring total lung capacity, vital capacity, maximum breathing capacity, tidal volume, functional residual capacity and oxygen uptake of human subjects. The spirometer, which employs two mechanically interconnected bellows, is compact, retains calibration, and is unaffected by acceleration fields along all three coordinate axes.



APPARATUS PROVIDING A DIRECTIVE FIELD PATTERN AND ATTITUDE SENSING OF A SPIN-STABILIZED SATELLITE

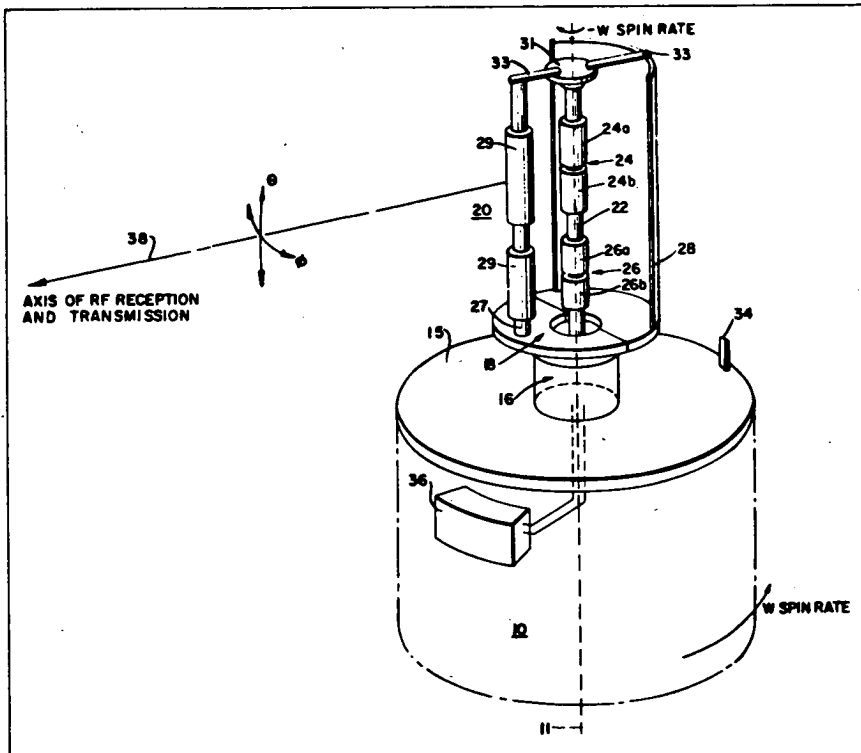
NASA Case No. XGS-02607

**Australia, Canada, France, Italy,
Netherlands, Japan, Sweden,
West Germany, Great Britain**

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Goddard Space Flight Center
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[Corresponding to U.S. Patent No. 3,341,151]

A satellite, adapted to spin about an axis, having antenna elements for communicating with a remote body and a beam collimator rotatable with respect to the spin axis. The beam collimator is rotated at the same rate and in the opposite direction as the spin of the satellite to provide a directional beam stationary in space. Ejection apparatus enables the collimator to be jettisoned in event of rotational malfunction so that an omnidirectional beam may be provided about the spin axis. Signal processing circuitry operating in conjunction with the antenna elements provides information concerning the attitude of the satellite.



MAGNETOMOTIVE METAL WORKING DEVICE

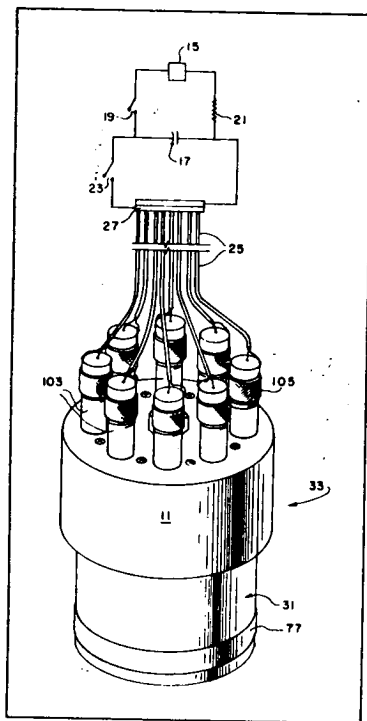
NASA Case No. XMF-03793

Canada

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Huntsville, AL 35812
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[Corresponding to U.S. Patent No. 3,360,972]

A portable magnetic hammer, a metal working device developed in the course of the Saturn program, wherein energy for manipulating a metal workpiece is acquired by creating a high-intensity magnetic field from a controlled electrical discharge into a conductor coil. This compact, lightweight device performs sizing, blanking, and stress removal functions without surface marring of the metals. It is expected that the magnetic hammer would find use in many environments particularly in removing dents, deformed or depressed surfaces from vehicles, fenders and bodies, tanks, etc.



FLUID FLOW SENSOR

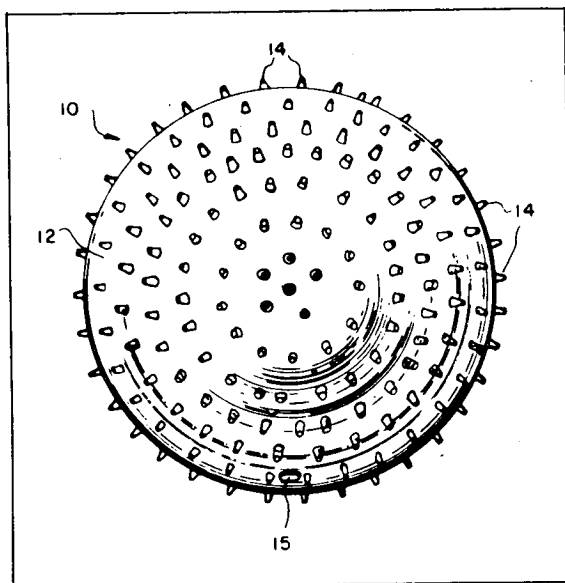
NASA Case No. XMF-04163

Canada

Address inquiries to:
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Huntsville, AL 35812
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[Corresponding to U.S. Patent No. 3,340,732]

A meteorological balloon having superior response and aerodynamic stability characteristics due to provision of a plurality of evenly dispersed protuberances on the balloon surface. These protuberances form a roughened surface to provide a more evenly distributed flow separation area to induce a larger balloon wake, resulting in greater stability in flight.



APPARATUS FOR CONTROLLABLY HEATING FLUID

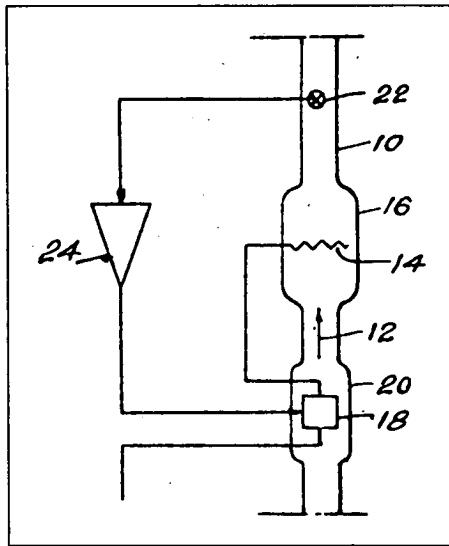
NASA Case No. XMF-04237

Canada

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Marshall Space Flight Center
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Huntsville, AL 35812
U.S.A.

[Corresponding to U.S. Patent No. 3,517,162]

This invention is associated with fluid heating devices which operate by circulating fluid past an electronically controlled heater element in a flow conduit. The efficiency of such devices is increased by placing the heater control components in the conduit, upstream from the heater element, thereby utilizing the heat generated in the control components for preheating the fluid anterior to the principal heater element.



TIME DIVISION MULTIPLEX SYSTEM

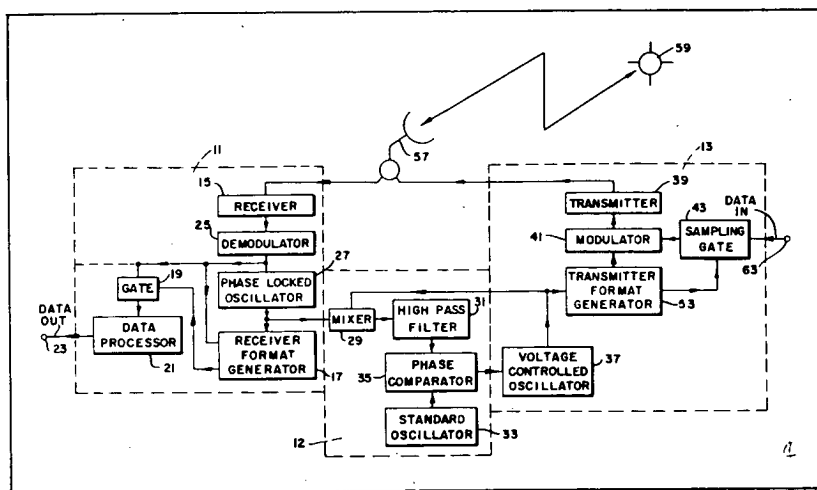
NASA Case No. XGS-05918

Canada, France, Netherlands,
Japan, Great Britain
West Germany

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Goddard Space Flight Center
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Greenbelt, MD 20771
U.S.A.

[Corresponding to U.S. Patent No. 3,430,237]

Apparatus for synchronizing a satellite time division multiplex system so that signals can be transmitted or received between any of the stations. The system constantly compensates for Doppler shift so that a medium altitude satellite is always in synchronization. Additionally, a system is provided for centering a slave station in an empty slot in the time division multiplex format.



THERMAL CONTROL PANEL

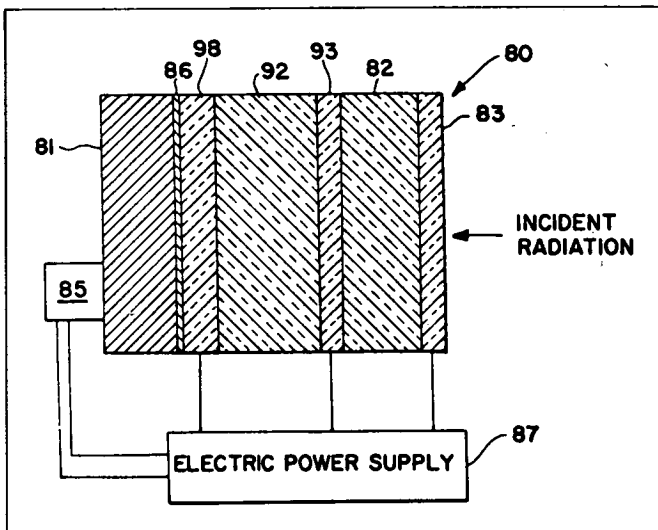
NASA Case No. XLA-07728

Canada

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Langley Station
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[Corresponding to U.S. Patent No. 3,374,830]

It is necessary to protect the interior of space vehicles from the extreme environmental temperature changes encountered in space missions. For this purpose a thermo-sensitive panel construction has been developed for achieving selectively changeable and controllable surface solar absorptivity/emissivity ratios. The result is obtained by altering the molecular structure of the panel construction through such changes as electroluminescence, semiconductivity, photovoltaic effect and electro-optical polarization.



MICROWAVE FLAW DETECTOR

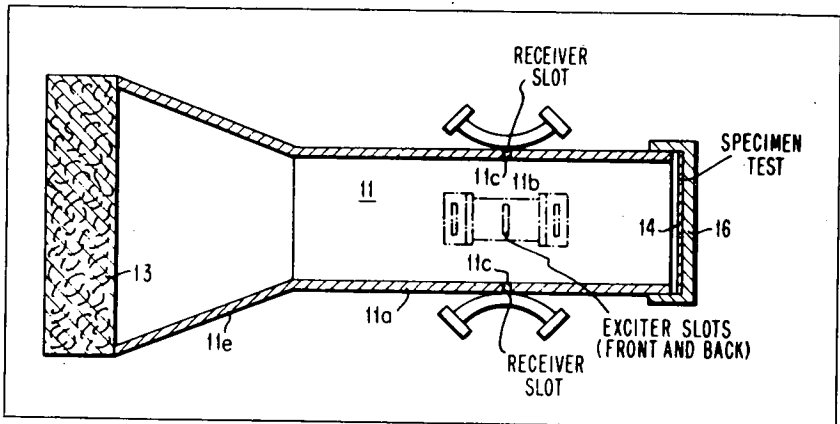
NASA Case No. ARC-10009

Canada

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Moffett Field, CA 94035
U.S.A.

[Corresponding to U.S. Patent No. 3,532,973]

The basic theory of a microwave metal surface flaw detector is that irradiation of a flawed metal surface by electromagnetic microwave energy results in re-emission of electromagnetic energy from the surface in a pattern of eigenmodes different from those of the original irradiating signal. The incident microwave signal must satisfy the electromagnetic boundary conditions on the surface of the specimen. In accordance with the present invention, there is provided a flaw detection system utilizing microwave energy which is radiated to the test surface and which varies in a cyclic or return-to-zero manner. The test surface modifies the reflected electromagnetic energy, in accordance with the surface condition, so that the reflected energy provides a measure of the surface condition as a function of the cyclic scan angle. This reflected energy is demodulated and then correlated, either with itself or with a reference pattern, to provide an indication of irregularities in the surface.



FIRE RESISTANT COATING COMPOSITION

NASA Case No. GSC-10072

Canada, France,
Italy, Japan,
Great Britain, West Germany

Address inquiries to:

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[Corresponding to U.S. Patent No. 3,493,401]

Fire resistant coating compositions intended for high temperature applications, which when dried are flake, crack, craze, and abrasion resistant and of greatly reduced leachability. The compositions, which are combinable with selected conventional pigments and fillers, comprise a combination of a potassium silicate solution, ceric oxide, and/or alkyl trialkoxy silane as rehydration suppressants, and wollastonite as a film builder.

TRAFFIC CONTROL SYSTEM AND METHOD

NASA Case No. GSC-10087-1

Address inquiries to:

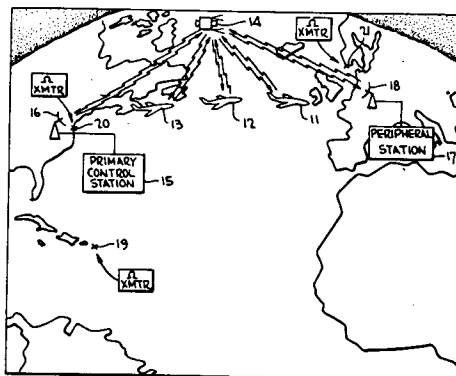
Belgium, Canada,
France, Italy, Japan,
Switzerland, Great Britain

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Attn: Patent Counsel
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Greenbelt, MD 20771
U.S.A.

[Corresponding to U.S. Patent No. 3,534,367]

System and method for position locating, deriving centralized air traffic control, data, and communicating via voice and digital signals between a multiplicity of remote aircraft (including supersonic transports) and a central station, as well as a peripheral ground station(s), through a synchronous satellite relay station. Side tone ranging patterns, as well as digital and voice signals are modulated on a carrier transmitted from the central station and received on all of the supersonic transports. Each aircraft communicates with the ground stations via a different frequency multiplexed spectrum. Supersonic transport position is derived from a computer at the central station and supplied to a local air traffic controller. Position is determined in response to variable phase information imposed on the side tones at the aircraft, and relayed back to the transports. Common to all of the side tone techniques is Doppler compensation for the supersonic transport velocity.

The patent coverage of GSC-10087-1 is directed to transmitting a first side tone spectrum from a first point, transmitting a carrier modulating with a second side tone spectrum from a second point, receiving the first and second spectrums on an aircraft, determining from the phase of the tones the distance of the aircraft relative with the first and second points, determining the distance of the aircraft from the center of the Earth, and then combining the three distances to establish the location of the aircraft.



POSITION LOCATION SYSTEM AND METHOD

NASA Case No. GSC-10087-2

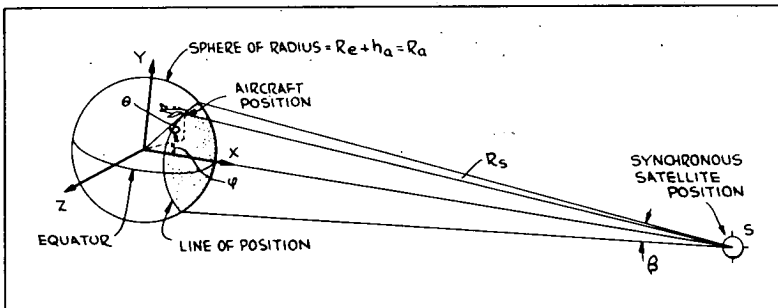
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[Corresponding to U.S. Patent No. 3,495,260]

System and method for position locating, deriving centralized air traffic control data, and communicating via voice and digital signals between a multiplicity of remote aircraft (including supersonic transports) and a central station, as well as a peripheral ground station(s), through a synchronous satellite relay station. Side tone ranging patterns, as well as digital and voice signals are modulated on a carrier transmitted from the central station and received on all of the supersonic transports. Each aircraft communicates with the ground stations via a different frequency multiplexed spectrum. Supersonic transport position is derived from a computer at the central station and supplied to a local air traffic controller. Position is determined in response to variable phase information imposed on the side tones at the aircraft, and relayed back to the transports. Common to all of the side tone techniques is Doppler compensation for the supersonic transport velocity.

The claim coverage of GSC-10087-2 varies in at least one respect in that the Doppler frequency shift on the carrier is utilized to provide a determination of the velocity of the object relative to a satellite station.



TRANSVERSE PIEZORESISTANCE AND PINCH EFFECT ELECTROMECHANICAL TRANSDUCERS

NASA Case No. ERC-10088

Canada, France, Japan, West Germany,
Great Britain

Address inquiries to:

NASA Headquarters

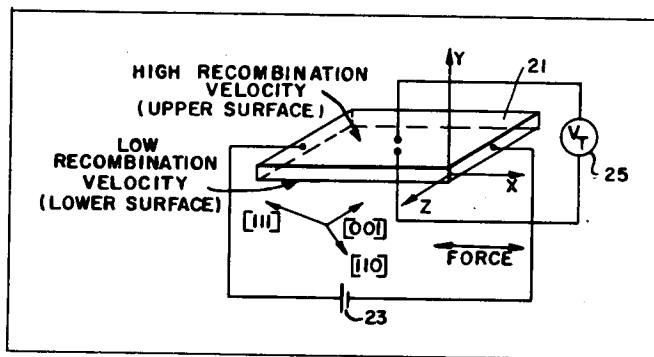
Code GP

Washington, DC 20546

U.S.A.

/Corresponding U.S. Patent No. 3,537,305/

This invention is a replacement for strain gages and accelerometers. The device may be used in any environment where conventional piezoresistive or strain gage electromechanical transducers can be used. In addition to the foregoing uses, the device can be used in bioelectric sensing due to its small size. The transducer, of anisotropic piezoresistive material, includes a body of semiconductor material having a longitudinal force axis that is skewed with respect to the crystallographic orientation of the body. The material combines the pinch effect with the piezoresistive effect. The device produces a much larger electrical signal for a given stress than presently known in the prior art.



FIRE RETARDANT FOAMS

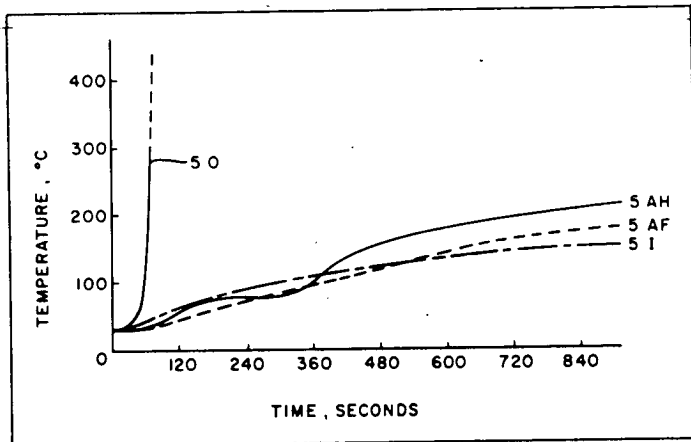
NASA Case No. ARC-10098

*See address below.

Australia, Belgium, Canada, France,
Italy, Japan, Sweden, Switzerland,
Great Britain, West Germany,
Netherlands

[Corresponding to U.S. Patent No. 3,549,564]

This invention improves upon polyurethane foams as fire resistant materials by improving their characteristics and by imparting fire suppressant and fire retardant characteristics. The main structure of the material is a rigid or semi-rigid polyurethane foam, preferably of a highly branched structure, in which are incorporated one or more materials to impart special properties. Modified foams have been developed which provide effective protection for thermally sensitive structures against the destructive action of fuel-fires. The invention relates to the modification of closed cell rigid and semi-rigid polyurethane foams in the density range of from 0.50 to 50 pounds per cubic foot. The modifying agents include three types: a certain class of alkyl halide resins, a certain class of inorganic salts, and encapsulated halogen bearing volatile molecules. The modified foam may then be applied by conventional methods. Outstanding protection against fire has been achieved.



*Exclusively licensed to Avco Corporation. Please direct inquiries to: Fire Protection Materials, Avco Corporation, Avco Systems Division, Lowell Industrial Park, Lowell, Massachusetts 01851.

INTUMESCENT PAINTS

NASA Case No. ARC-10099

*See address below.

Australia, Belgium, Canada, France,
Italy, Japan, Sweden, Switzerland,
Great Britain, West Germany,
Netherlands

/Corresponding to U.S. Patent No. 3,535,130/

Intumescent (swelling or expanding) paints useful for fire protection have been produced. Conventional intumescent paints suffer from many disadvantages including sensitivity to water and other solvents, little resistance to scuffing and abrasion, sensitivity to thermal erosion by flames, and limited efficiency in the protection of substrates under thin steel plate or sheet. This paint overcomes these disadvantages and provides outstanding protection. The intumescent material is an aromatic nitroamino compound in the form of its sulfate, either dissolved or dispersed in a vehicle, or prepolymerized, or both. Upon heating, such a paint intumesces, chars and provides a flame resistant coating.

*Exclusively licensed to Avco Corporation. Please direct inquiries to: Fire Protection Materials, Avco Corporation, Avco Systems Division, Lowell Industrial Park, Lowell, Massachusetts 01851.

UNSATURATING SATURABLE CORE TRANSFORMER

NASA Case No. ERC-10125

Canada, France, Netherlands,
Italy, Japan, Great Britain,
West Germany

Address inquiries to:

NASA Headquarters

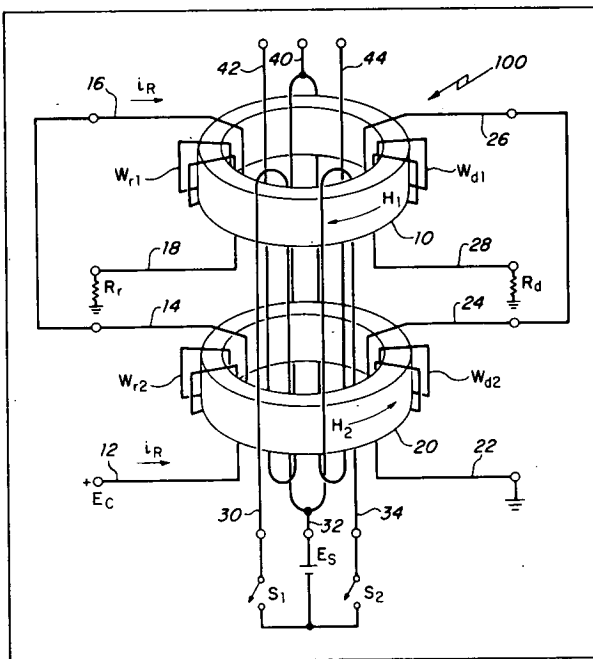
Code GP

Washington, DC 20546

U.S.A.

[Corresponding U.S. Patent No. 3,541,428]

The transformer of the present invention will not saturate at any time under any conditions for any length of time. The device includes a pair of stacked, uncut, saturable magnetic cores having a plurality of windings. The cores operate in parallel and provide a means of detecting, warning and suppressing any impending saturation before saturation can occur. Many advantages are gained from the use of this transformer such as: elimination of the main apparent cause of power transistor failure in inverter circuits while enabling existing power transistors to process double or more load current, and, enabling a better utilization of existing components because it reduces the need to derate switching components to a small fraction of their current carrying capacity.



METHOD AND APPARATUS FOR MEASURING THE DAMPING CHARACTERISTICS OF A STRUCTURE

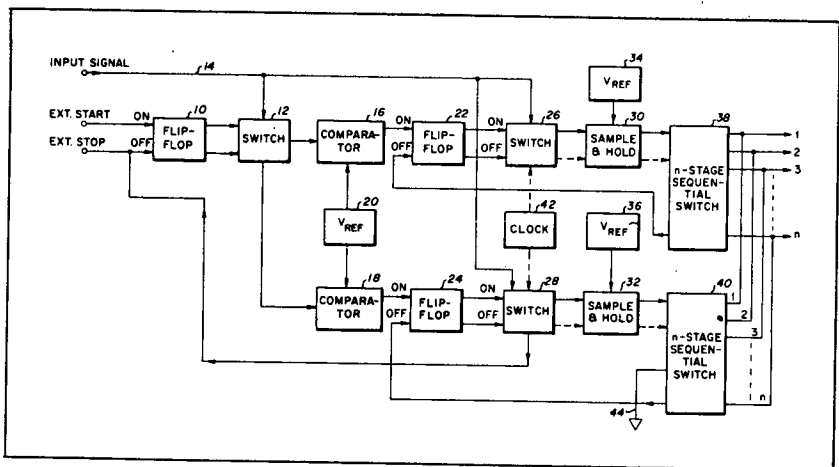
NASA Case No. ARC-10154

Canada, France, Japan,
Great Britain, West Germany

Address inquiries to:
Ames Research Center
Attn: Patent Counsel
Mail Code: 200-11A
Moffett Field, CA 94035
U.S.A.

[Corresponding to U.S. Patent No. 3,620,069]

Spectral analyzers and correlation computers have been used in the past to provide the most useful damping data heretofore available; however, these types of apparatus either require too much time to obtain accurate values of damping characteristics or can only be used with linear systems. The present invention relates to an automatic on-the-line instrument for measuring the damping characteristics of a structure or system during excitation by random forces or influences. The apparatus is comprised of at least two parallel sampling circuits which perform time sequential sampling operations on predetermined portions of a given input signal. After summing the outputs of the sampling circuits at output terminals, a sampling transient indicative of a point on the damping characteristic of the structure can be obtained.



CENTRIFUGAL LYOPHOBIC SEPARATOR

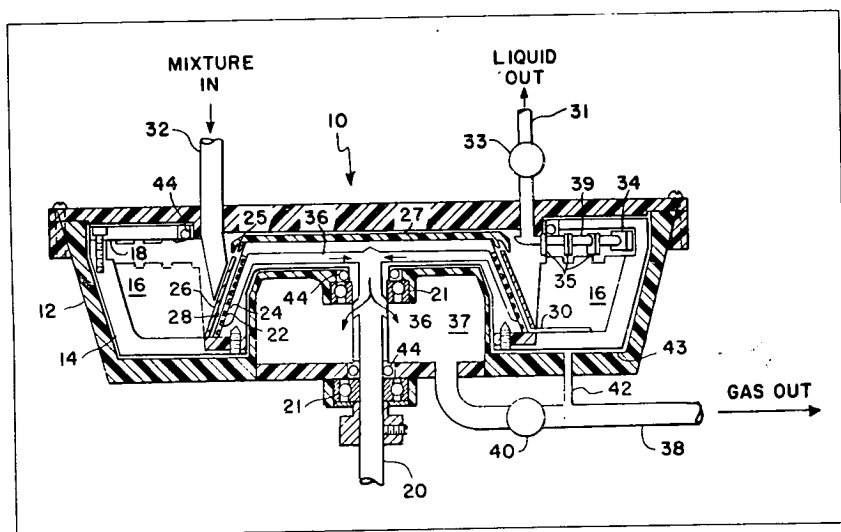
NASA Case No. LAR-10194-1

Canada, Great Britain, France,
West Germany, Japan, Italy,
Switzerland

Address inquiries to:
Langley Research Center
Attn: Patent Counsel
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Langley Station
Hampton, VA 23665
U.S.A.

[Corresponding U.S. Patent—Application Pending]

This is a centrifugal separator for the separation of aerosols from a mixed stream of gas and liquid. The invention utilizes both centrifugal force and a lyophobic filter, the combination of which presents several advantages. This invention relates to a centrifugal separator and more particularly to a separator of aerosols from a mixed stream of gas and liquid utilizing both centrifugal force and a lyophobic filter. The use of lyophobic filters to separate liquid aerosols from a gas stream is known in the art. Using both lyophobic filtration and centrifugal force however, has several advantages over the use of either method of separation by itself.



METALLIC INTRUSION DETECTOR SYSTEM

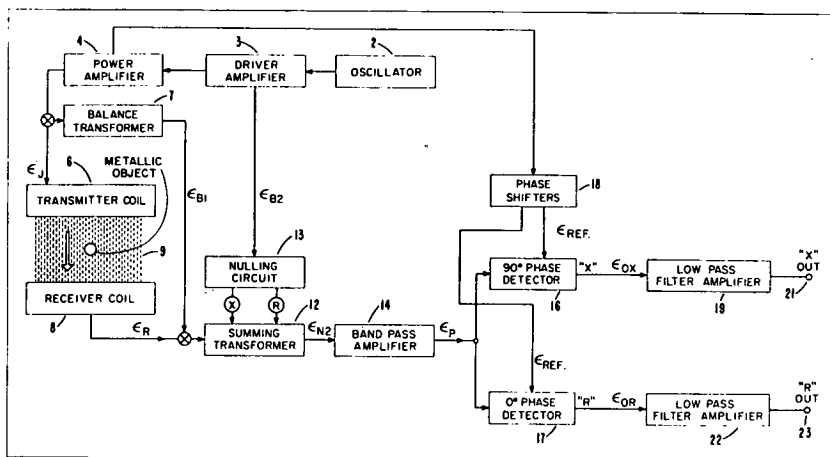
NASA Case No. ARC-10265-1

Great Britain, France, Canada,
West Germany, Netherlands, Japan

Address inquiries to:
Ames Research Center
Attn: Patent Counsel
Mail Code: 200-11A
Moffett Field, CA 94035
U.S.A.

[Corresponding to U.S. Patent No. 3,676,772]

A system is described for determining the intrusion, relative size, and the physical characteristics of a metallic object in a predetermined space. Transmitter and receiver coil assemblies are arranged to define a space through which a metallic object is expected to pass. The assemblies are adapted to generate an electromagnetic field of predetermined energy per unit volume, with the receiver coil coupled to the energy source to indicate the intrusion of a metallic object into the electromagnetic field, whether the object is ferrous or nonferrous, and the size of the object.



MODIFIED POLYISOCYANURATE POLYMER FOAM

NASA Case No. ARC-10280

*See address below.

Canada, France, Italy, Japan.
Great Britain, West Germany

[Corresponding to U.S. Patent--Application Pending]

The subject matter of this invention is directed to a fire retardant polyisocyanurate foam which is resistant to high temperatures and which has exceptional dimensional stability. In general, the present invention is carried out by reacting an organic polyisocyanate in the presence of a blowing agent and catalyst with a low hydroxyl number, high molecular weight linear polyether polyol comprising a condensation product of a multi-functional polyol and propylene oxide with grafted polyacrylonitrile branched side chains. Thus the crux of the present invention is the employment of a polyol having grafted acrylonitrile side chains which cyclize at elevated temperatures to form stable heterocyclic structures. By employing the polyol having a high molecular weight and low hydroxyl number, only small amounts of the isocyanate groups are consumed to form urethane linkages.

*Exclusively licensed to Avco Corporation. Please direct inquiries to: Fire Protection Materials, Avco Corporation, Avco Systems Division, Lowell Industrial Park, Lowell, Massachusetts 01851.

**POLYMERIC VEHICLES AS CARRIERS FOR
SULFONIC ACID SALT OF NITROSUBSTITUTED
AROMATIC AMINES**

NASA Case No. ARC-10325

*See address below.

Canada, Japan, West Germany, Great Britain

[Corresponding to U.S. Patent No. 3,663,464]

Intumescent coatings when applied to the surface of an article provide protection from fire and heat. Many applications of the coatings (or paints) are envisioned which include use in schools, homes, office buildings, ships, spacecraft, aircraft, etc. This invention relates to an intumescent agent which contains the ammonium salt of 4-nitroaniline-2-sulfonic acid and a polymer of the mercaptan type which may contain disulfide linkages or polyoxyalkylene linkages. The adhesion and char resistance of such compositions can be further improved by the addition of epoxy resins. The composition exhibits high hydrolytic stability.

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ANTI-GLARE IMPROVEMENT FOR OPTICAL IMAGING SYSTEMS

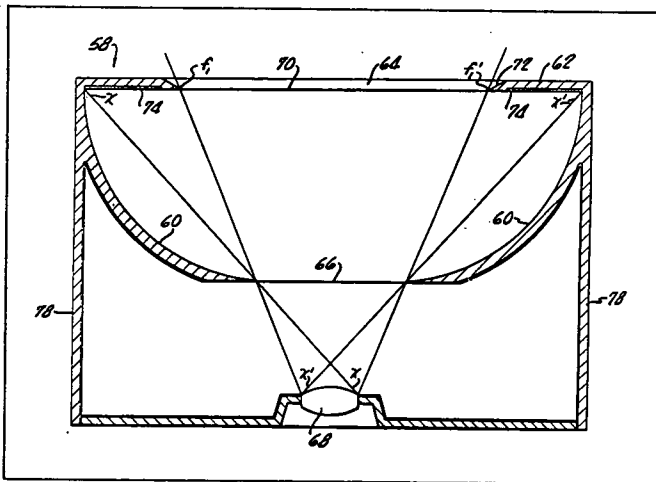
NASA Case No. NPO-10337

Belgium, Canada, France, Great Britain,
Italy, Japan, West Germany

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Attn: Patent Counsel
Mail Code: 180-601
4800 Oak Grove Drive
Pasadena, CA 91103
U.S.A.

[Corresponding to U.S. Patent No. 3,488,103]

This invention is directed to an anti-glare baffle for shading rays such as light rays or other radiant energy rays which emanate from outside a desired field of view. The device may find use in sensitive still and movie cameras, light meters, telescopes, radiometers, photometers, electro-optical position sensors, photocell shades, star tracking devices and the like. The anti-glare baffle has a specularly reflective surface formed from an oblate hemispheroid. A shading flange extends inwardly from the upper edge of the hemispheroid and intersects the foci of the oblate hemispheroid. The oblate hemispheroid and flange surround a viewing aperture and spaced ray detecting device.



METHOD FOR THE REPAIR AND MAINTENANCE OF DENTAL ENAMEL

NASA Case No. ERC-10338

Canada

Address inquiries to:
Marshall Space Flight Center
Attn: Patent Counsel
Mail Code: A&PS-PAT
Huntsville, AL 35812
U.S.A.

[Corresponding to U.S. Patent No. 3,679,360]

A process for the preparation of calcium phosphate salts wherein a calcium phosphate salt is deposited from a gel medium onto the surface of a tooth. The use of the gel diffusion process to deposit the constituents of tooth enamel onto the surface of a weak or damaged tooth and thereby effect repair of the tooth is disclosed.

USE OF UNILLUMINATED SOLAR CELLS AS SHUNT DIODES FOR A SOLAR ARRAY

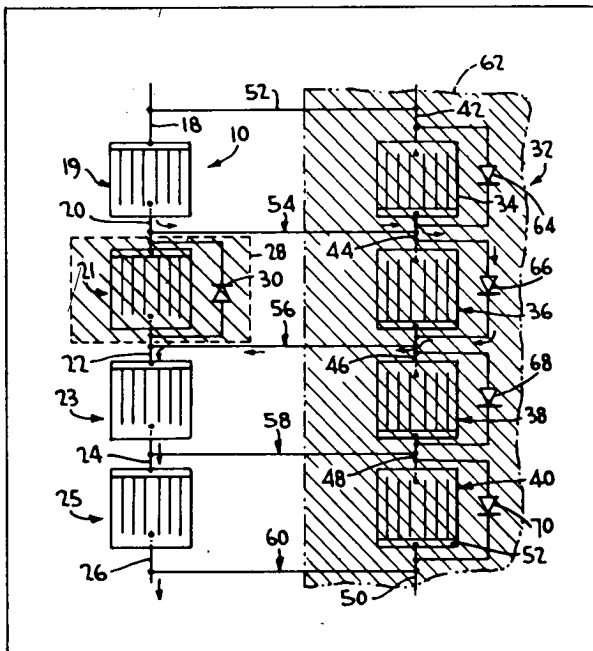
NASA Case No. GSC-10344

Canada, France, Netherlands,
Italy, Japan, Great Britain,
West Germany

Address inquiries to:
Goddard Space Flight Center
Attn: Patent Counsel
Mail Code: 204
Greenbelt, MD 20771
U.S.A.

[Corresponding to U.S. Patent No. 3,672,999]

An improvement has been made in the electrical interconnection of solar cells in an array of solar batteries. Each individual cell of a shaded battery is electrically connected in parallel with a corresponding cell of an illuminated solar battery. The p-n junction solar cell of the shaded battery provides a forward biased diode equivalent in a by-pass conducting path around the corresponding illuminated cell in the event it becomes non-conductive. Thus, uninterrupted current flow is maintained in the event the illuminated cell fails to function.



POTASSIUM SILICATE-ZINC COATINGS

NASA Case No. GSC-10361

Canada, France, Italy,
Japan, Great Britain,
West Germany,

Address inquiries to:
Goddard Space Flight Center
Attn: Patent Counsel
Mail Code: 204
Greenbelt, MD 20771
U.S.A.

[Corresponding to U.S. Patent No. 3,620,784]

Zinc dust coatings which, when dried on a metal surface, are crack, craze, and abrasion resistant. The coatings are formed by combining a potassium silicate solution with zinc dust and, optionally, including an alkyl trialkoxysilane. These compositions of basically inorganic materials are intended primarily for the protection of metals subject to adverse environmental conditions.

DEPOSITION OF FILMS

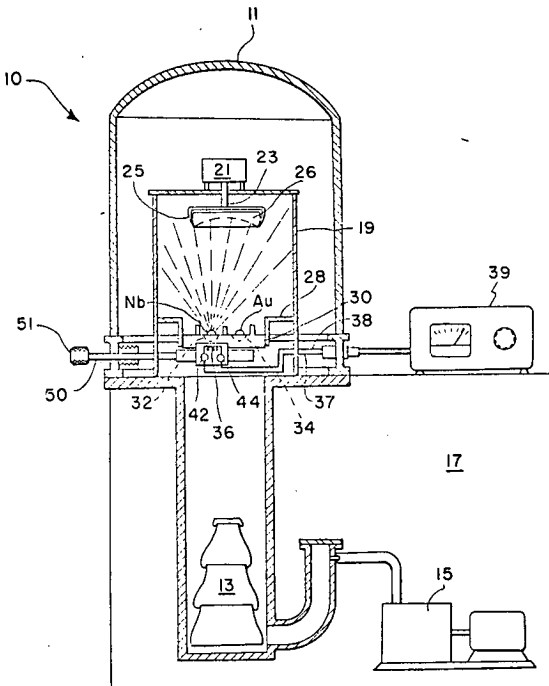
NASA Case No. LAR-10362

Canada, France, Japan,
Great Britain, West Germany

Address inquiries to:
Langley Research Center
Attn: Patent Counsel
Mail Code: 456
Langley Station
Hampton, VA 23665
U.S.A.

[Corresponding U.S. Patent – Application Pending]

A system for depositing multilayer protective coatings on a glass or quartz substrate wherein a single heat source evaporates selective ones of a plurality of vaporizable metal coatings contained in the vacuum chamber with the substrate to be coated. The metal coating materials are contained in an electrically grounded crucible with an electrical potential of approximately 2000 volts being generated between the crucible and a cathode filament and wherein a magnetic field is provided perpendicular to the propagation direction of the electrons generated for bending the electron beam trajectory toward the coating metal contained in the crucible.



HONEYCOMB CORE STRUCTURES OF MINIMAL SURFACE TUBULE SECTIONS

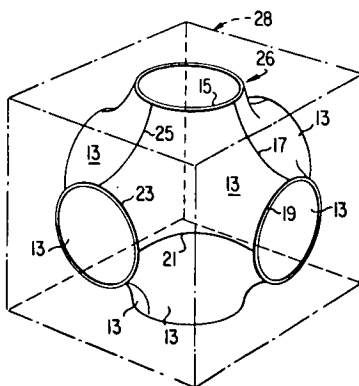
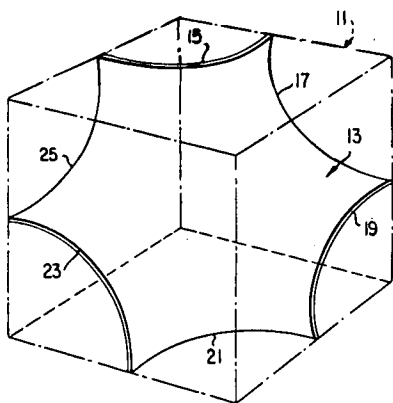
NASA Case No. ERC-10363

Canada, India,
Great Britain

Address inquiries to:
Goddard Space Flight Center
Attn: Patent Counsel
Mail Code: 204
Greenbelt, MD 20771
U.S.A.

[Corresponding to U.S. Patent No. 3,663,346]

Honeycomb cores formed of tubule sections bounded orthogonally by plane facings are described. The tubule sections are defined as being formed of minimal surface elements that orthogonally intersect all of the surfaces of a kaleidoscopic cell at least once. In other words, the tubule sections are broken into elements for definition purposes. The elements are defined as minimal surface elements, i.e., elements that have a mean curvature that is equal to zero at all points on their surface. These elements are further defined inside an imaginary kaleidoscopic cell in that they orthogonally intersect all surfaces of an imaginary kaleidoscopic cell at least once. The tubule sections are smoothly interconnected to form honeycomb core structures that have no internal discontinuities.



EXPANDABLE SPACE FRAMES

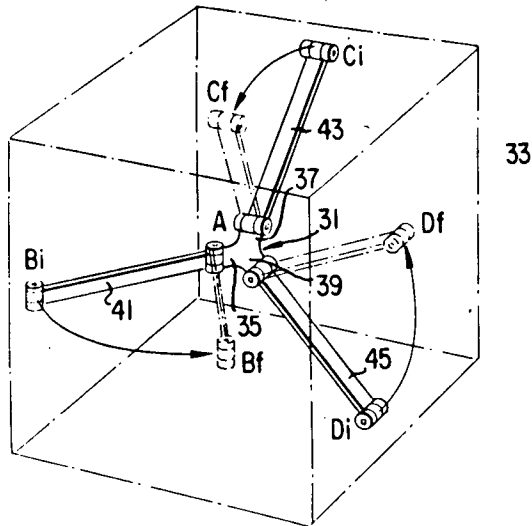
NASA Case No. ERC-10365

Great Britain, West Germany,
Belgium, Sweden, Japan, Argentina,
Canada, Netherlands, Mexico,
Switzerland, France, Italy,
Australia, India

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[Corresponding to U. S. Patent No. 3,757,476]

Expandable space-frames formed of a plurality of hinge joint assemblies and struts are reported in this invention. The space-frames are utilized in various types of structures. They can form a basic building structure or can be utilized in a planar manner to form the floors and walls of a structure. They can be utilized in space to define a structure such as a manned orbiting laboratory.



ELECTRON MICROSCOPE APERTURE SYSTEM

NASA Case No: ARC-10448-1

Canada, France, Japan, Germany,
Great Britain, Netherlands

Address inquiries to:
Ames Research Center
Attn: Patent Counsel
Mail Code: 200-11A
Moffett Field, CA 94035
U.S.A.

[Corresponding U.S. Patent—Application Pending]

An electron microscope is described, which includes an electron source, a condenser lens having either a circular aperture for focusing a solid cone of electrons onto a specimen or an annular aperture for focusing a hollow cone of electrons onto the specimen, and an objective lens with an annular objective aperture, for focusing electrons passing through the specimen onto an image plane. The invention also entails a method of making the annular objective aperture, using electron imaging, electrolytic deposition, and ion etching techniques.

INFRARED TUNABLE LASER

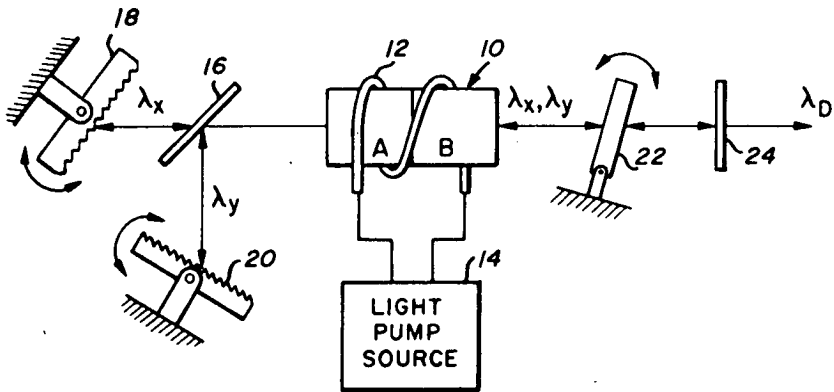
NASA Case No. ARC-10463

Belgium, Canada, France,
Germany, Japan, Great
Britain, Netherlands

Address inquiries to:
Ames Research Center
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Moffett Field, CA 94035
U.S.A.

[Corresponding to U.S. Patent No. 3,753,148]

The invention relates to laser apparatus for providing an intense source of coherent laser radiation which is tunable from the visible wavelengths through the infrared wavelengths. It can be used in absorption spectroscopy and in the detection and monitoring of pollution in the atmosphere. Selected radiation of the tunable laser is passed through the non-linear mixing crystal causing it to develop radiation of a third wavelength which is transmitted out of the optical cavity through the third reflector.



POLYIMIDE FOAM FOR THERMAL INSULATION AND FIRE PROTECTION

NASA Case No. ARC-10464-1

Canada, Great Britain, France,
West Germany, Japan, Italy,
Switzerland

Address inquiries to:

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Moffett Field, CA 94035
U.S.A.

[Corresponding U.S. Patent—Application Pending]

In the preparation of polyimide foams by the reaction of polyisocyanates and polyfunctional aromatic acid derivatives, flame retardant foamed products of improved cell quality, friability, and resiliency are obtained by conducting the reaction in the presence of an alkanolamine, such as 1-hydroxyethyl-2-heptadecenyl glyoxalidine. Another aspect of the invention resides in the finding that polyimide foams of reproducible density above 1 lb/cu ft and below 6 lbs/cu ft can be obtained by, employing in the reaction at least 2% by weight of siloxane-glycol copolymer as a surfactant which acts as a specific density control agent. A further feature of the invention is the production of polyimide foams into which reinforcing fibers such as silicon dioxide and carbon fibers may be incorporated.

SHOULDER HARNESS AND LAP BELT RESTRAINT SYSTEM

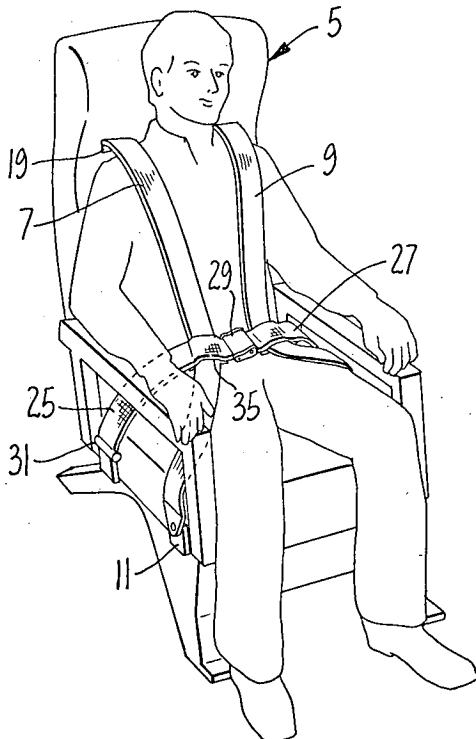
NASA Case No. ARC-10519

Australia, Canada, France,
Great Britain, Italy, Japan
Sweden, West Germany

Address inquiries to:
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Mail Code: 200-11A
Moffett Field, CA 94035
U.S.A.

[Corresponding U.S. Patent – Application Pending]

The present invention provides a shoulder harness which is held by inertia reels so that the user is not unduly restrained and can freely move about, yet the reels will instantly lock when the user is subjected to deceleration forces. The shoulder straps preferably pass through openings in the seat itself so that they are substantially at shoulder height and there is little chance of the straps slipping off of the shoulders. The combined restraint of the present invention provides for slippage between the lap belt and the shoulder straps so that it readily adapts itself to users of different sizes.



GRAVITY GRADIENT ATTITUDE CONTROL SYSTEM

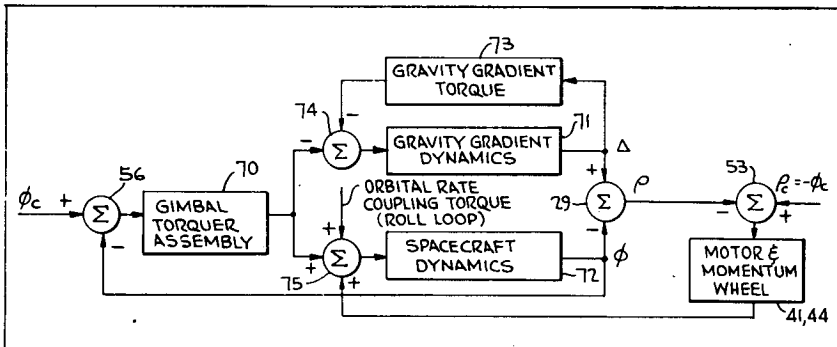
NASA Case No. GSC-10555

Canada, France, Japan,
Great Britain, West Germany

Address inquiries to:
Goddard Space Flight Center
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Mail Code: 204
Greenbelt, MD 20771
U.S.A.

[Corresponding to U.S. Patent No. 3,567,155]

A system for controlling and stabilizing the attitude of an artificial earth satellite includes a gravity gradient member mounted in a gimbal arrangement to have two degrees of freedom. The angular deviation of the gravity gradient member and the satellite relative to the local vertical and the spacecraft angle command input signal selectively drive a plurality of inertial momentum wheels, one for each of the three spacecraft axes, provided to dampen the gravity gradient member librations. The gravity gradient member is controlled so that the equilibrium position of the longitudinal axis thereof is maintained in alignment with the local vertical in response to signals indicative of the rate of change of movement thereof with respect to the remainder of the satellite and a signal indicative of the angular deviation of the satellite position from the angle command.



AIRFOIL SHAPE FOR FLIGHT AT SUBSONIC SPEEDS

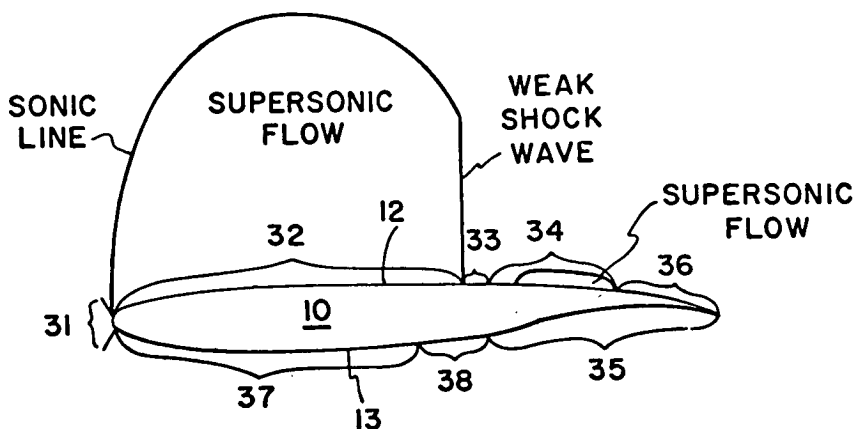
NASA Case No. LAR-10585-1

Canada, France, Germany, Japan,
Italy, Israel, Sweden, Australia,
Great Britain, Netherlands

Address inquiries to:
Langley Research Center
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Hampton, VA 23665
U.S.A.

[Corresponding U.S. Patent—Application Pending]

This invention relates to an airfoil for an aircraft and more particularly to an airfoil with a design Mach number in the range .7 to 1.0 and having an upper surface designed to delay shock wave induced boundary layer separation until high subsonic Mach numbers well above the critical Mach number are reached. The airfoil has an upper surface shaped to control flow accelerations and pressure distribution over the upper surface and prevents separation of the boundary layer due to shock wave formulation at high subsonic speeds well above the critical Mach number. A highly cambered trailing edge section improves overall airfoil lifting efficiency.



WATER PURIFICATION MEMBRANES AND METHOD OF PREPARATION

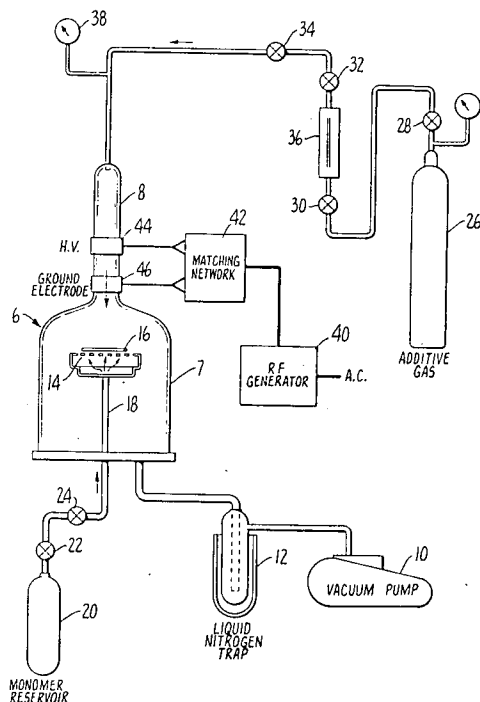
NASA Case No. ARC-10643

Australia, Canada, France,
Germany, Great Britain,
Italy, Japan, Israel,
Netherlands

Address inquiries to:
Ames Research Center
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Moffett Field, CA 94035
U.S.A.

[Corresponding U.S. Patent – Application Pending]

Reverse osmosis membrane technology has grown dramatically in recent years for the production of fresh water and is particularly important in the purification and reuse of water in space missions. The present invention contemplates the fabrication of membranes of allyl amine as thin films in the presence of a plasma discharge. The membranes are superior in that they do not have to be stored in pure H_2O , demonstrate salt rejection rates of 95% or more, do not compress under use, are formed without pinholes, and in any desired configuration, and, possess high adhesion on a variety of substrates.



SUPPRESSION OF FLUTTER

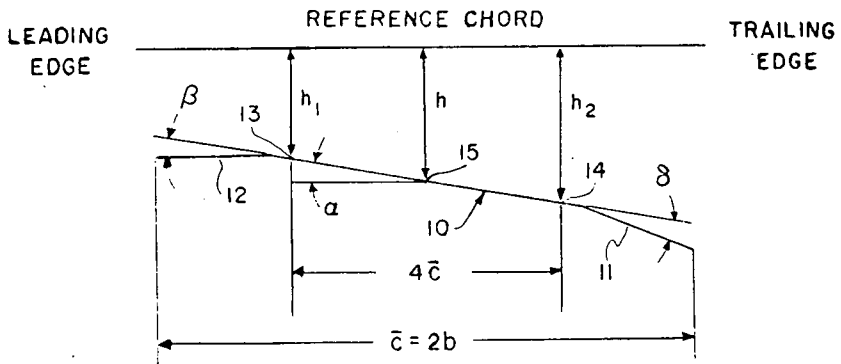
NASA Case No. LAR-10682-1

Great Britain, Japan, France,
Canada, West Germany, Italy,
Sweden

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[Corresponding to U. S. Patent No. 3,734,432]

An active aerodynamic control system is described for controlling flutter over a large range of oscillatory frequencies unaffected by mass, stiffness, elastic axis, or center of gravity location of the system, mode of vibration, or subsonic Mach number. It consists of one or more pairs of leading edge and trailing edge, hinged or deformable control surfaces, each pair operated in concert by a stability augmentation system. Torsion and bending motions or deflections of the fluttering member are sensed and converted by the stability augmentation system into leading and trailing edge control surface deflections which produce lift forces and pitching moments to suppress flutter.



IMPROVEMENTS FOR ABATING EXHAUST NOISES IN JET ENGINES

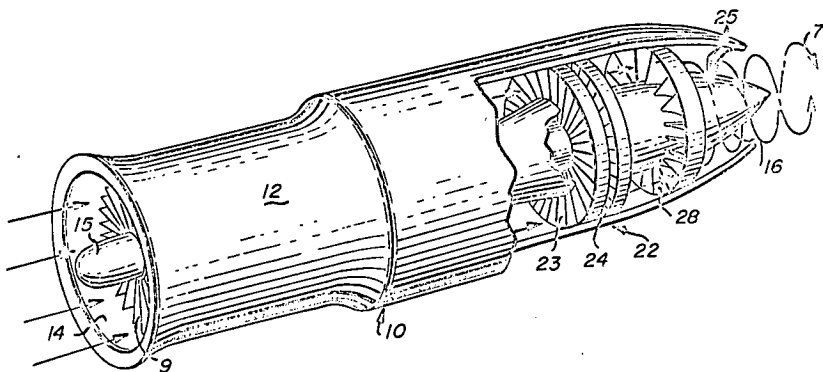
NASA Case No. ARC-10712

Australia, Canada, France,
Great Britain, Germany,
Israel, Italy, Japan,
Sweden

Address inquiries to:
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Mail Code: 200-11A
Moffett Field, CA 94035

[Corresponding U.S. Patent – Application Pending]

A noise abating improvement for jet engines including the provision of apparatus in the primary flow stream of gas turbine engines such as turbojet, turbofan, turboprop, and other jet engines such as ram jets, scram jets and hybrid jet engines, or in either the primary and/or secondary flow streams of turbofan engines or the like, for imparting to the exhaust gases a component rotation or swirl about the engine's longitudinal axis. The rotary component in the exhaust gases has the effect of substantially suppressing the build up on sound energy normally produced by an axial flow exhaust stream.



**FIBER MODIFIED POLYURETHANE FOAM
FOR BALLISTIC PROTECTION**

NASA Case No. ARC-10714

**Canada, France, Germany,
Great Britain, Italy, Japan,
Netherlands**

Address inquiries to:
Ames Research Center
Attn: Patent Counsel
Mail Code: 200-11A
Moffett Field, CA 94035
U.S.A.

[Corresponding U.S. Patent – Application Pending]

The closed cell, semi-rigid, fiber-loaded self-extinguishing foam of the present invention has properties of retarding penetration of incendiary ballistics, prevention of fire in the void spaces of the aircraft, providing support for the fuel cell, and strengthening the aircraft frame. The foam is based on a polyurethane resin and is filled with fibers and contains a fire retardant material. It does not produce noxious fumes when heated and the strength of the foam is enhanced by the fibers being oriented parallel to the surface of the substrate on which the foam is sprayed.

PROTECTION OF MOISTURE SENSITIVE OPTICAL COMPONENTS

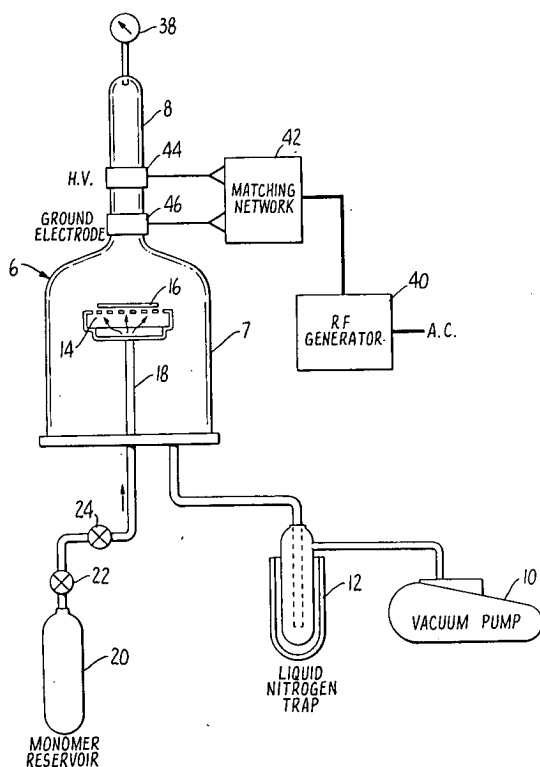
NASA Case No. ARC-10749

Canada, France, Italy,
Japan, Sweden, Germany,
Great Britain, Netherlands

Address inquiries to:
Ames Research Center
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Mail Code: 200-11A
Moffett Field, CA 94035
U.S.A.

[Corresponding U.S. Patent — Application pending]

Salt crystals used in IR spectroscopy required they be preserved in areas that are not dehumidified. If moisture forms on the crystal, etching results which destroys the effectiveness of the crystal. This invention contemplates coating the crystal with a perfluorinated polymer which not only prevents attack by moisture, but often has the added advantage of acting as an anti-reflective coating so that transmission is increased in nearly all regions of the IR spectrum.



OPTICAL RADIATION FREQUENCY CONVERTER AND METHOD

NASA Case No. HQN-10818

Canada, France, Germany,
Great Britain, Japan,
Netherlands

Address inquiries to:

NASA Headquarters

Attn: Patent Counsel

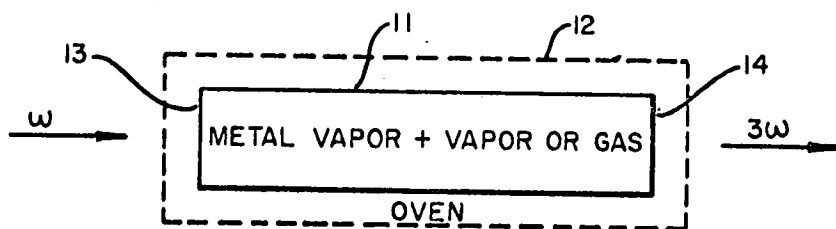
Mail Code: GP

Washington, D.C. 20546

U.S.A.

[Corresponding U.S. Patent—Application Pending]

This invention is an Optical Radiation Frequency Converter employing metal vapor which is useful in the ultraviolet region of the spectrum. The invention comprises a cell for retaining the metal vapor or gas which is surrounded by an oven. Monochromatic radiation passes through windows in the cell and oven. In the preferred embodiment, the metal vapor for accomplishing third harmonics is one which has its fundamental harmonic frequencies resonance in the spectral region between the fundamental frequencies and the third harmonic. The metal vapor must have a suitable refractive index to provide for phase matching.



TOTALLY CONFINED EXPLOSIVE WELDING

NASA Case No. LAR-10941-1

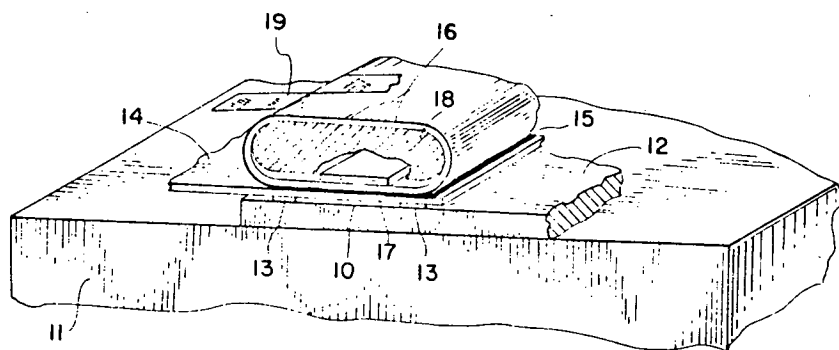
Japan, Germany, Canada,
Switzerland, Great Britain,
Australia

Address inquiries to:
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Mail Code: 456
Langley Station
Hampton, VA 23665
U.S.A.

[Corresponding to U. S. Patent No. 3,797,098]

The invention illustrates and describes a method and apparatus for eliminating the noise and debris of explosive welding techniques. This is accomplished by placing the explosive in a complete enclosure so that both the sound and debris of the explosion are contained in the enclosure. The welding is accomplished by the explosive pressure applied through the wall of the enclosure to the pieces to be joined.

The novelty of the invention is in eliminating the safety hazards and detrimental psychological effects of the loud noises and scattering of debris which result from use of unconfined explosive welding while maintaining the inherent simplicity of the technique.



BACTERIAL ADENOSINE TRIPHOSPHATE AS A MEASURE OF URINARY TRACT INFECTION

NASA Case No. GSC-11092-2

Great Britain, France, Canada,
West Germany, Japan

Address inquiries to:
Goddard Space Flight Center
Attn: Patent Counsel
Mail Code: 204
Greenbelt, MD 20771
U.S.A.

[Corresponding U.S. Patent—Application Pending]

A method is provided for determining bacterial levels in urine samples, which method depends on the quantitative determination of bacterial adenosine triphosphate (ATP) in the presence of non-bacterial adenosine triphosphate. After the removal of non-bacterial ATP, the bacterial ATP is released by cell rupture and is measured by an enzymatic bioluminescent assay using an enzyme obtained from the firefly.

STABILIZATION OF PIGMENTS

NASA Case No. NPO-11139

Great Britain, Canada, France,
West Germany, Japan, Italy

Address inquiries to:
NASA Pasadena Office
Attn: Patent Counsel
Mail Code: 180-601
4800 Oak Grove Drive
Pasadena, CA 91103
U.S.A.

[Abandoned in United States]

A method of coating pigment particles is described for preventing degradation and discoloration by ultraviolet light. The chemical species utilized serve as recombination sites for the electrons and holes produced by the radiation. The chemical species selected for a particular pigment should be one equivalent such that stable oxidation stages are formed differing by one electronic charge. Zinc oxide pigments coated with ferri- and ferrocyanide are discussed as an example.

STORED CHARGE TRANSISTOR

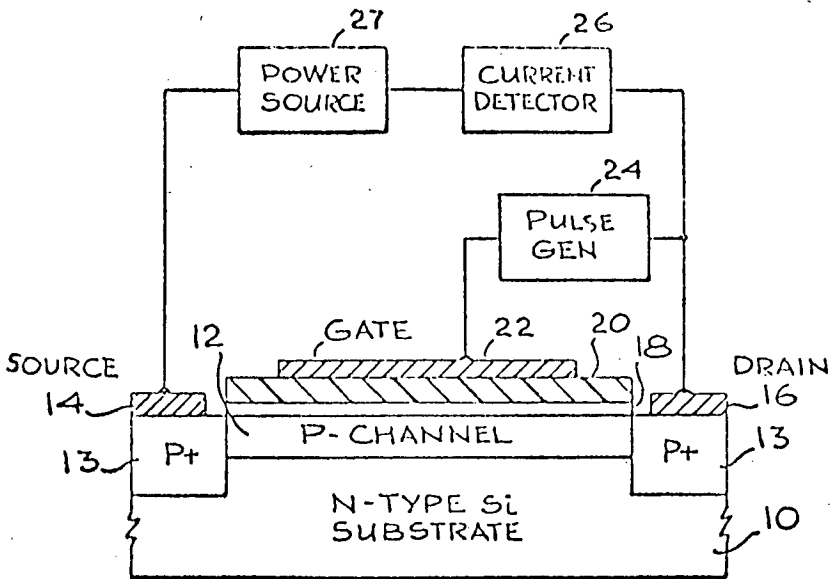
NASA Case No. NPO-11156-2

Canada, France, Germany,
Great Britain, Japan

Address inquiries to:
NASA Pasadena Office
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4800 Oak Grove Drive
Pasadena, CA 91103
U.S.A.

[Corresponding U.S. Patent – Application Pending]

A stored charge device of the general type designated as an MNOS field-effect transistor, has its operation improved by embedding a thin metal layer between two insulating films used in the transistor. The embedded metal layer technique is also used to provide a two-terminal thin-film stored charge device, consisting of a "metal-insulator-embedded metal-insulator-metal", sandwich structure which can be used in high-density memory arrays.



GRADED BANDGAP $\text{Al}_x\text{Ga}_{1-x}\text{As}$ -GaAs SOLAR CELL

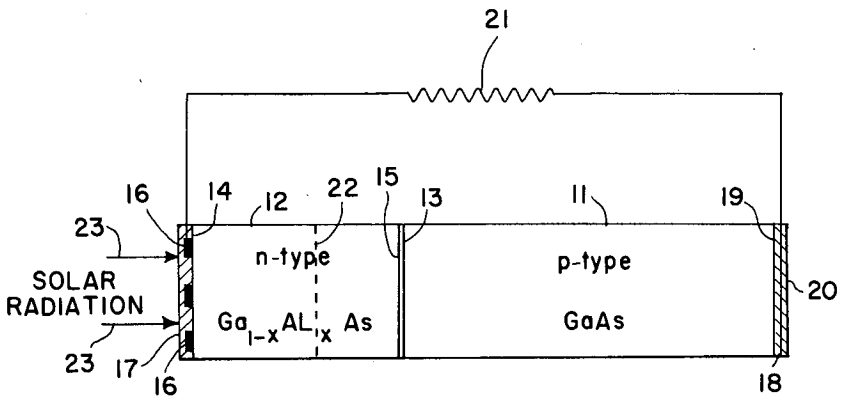
NASA Case No. LAR-11174

Address inquiries to:
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Langley Station
Hampton, VA 23665
U.S.A.

Canada, France, Japan,
Great Britain, Germany,
Italy, Netherlands

[Corresponding U.S. Patent – Application Pending]

This invention describes an improved solar cell of increased efficiency. The invention comprises a p-type GaAs crystal adjoining an n-type $\text{Ga}_{1-x}\text{Al}_x\text{As}$ crystal to form a p-n junction. The value of x varies linearly in the n-type crystal from $x=0$ at the junction of the two crystals to $x = .7$ at the opposite surface of the n-type crystal. Hence, when the said opposite surface of the n-type crystal is exposed to solar radiation, energy is delivered by the p-n junction more efficiently than it is delivered by prior p-n junction type solar cells.



EXPLOSIVELY WELDED SCARF JOINT

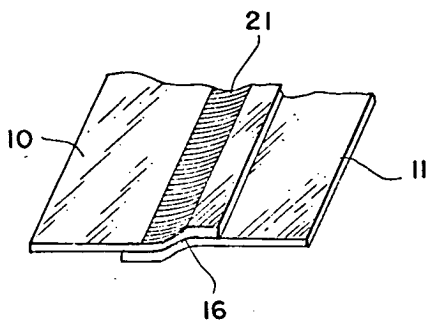
NASA Case No. LAR-11211-1

Japan, Germany, Canada,
Switzerland, Great Britain,
Australia

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Attn: Patent Counsel
Mail Code: 456
Langley Station
Hampton, VA 23365
U.S.A.

[Corresponding U.S. Patent—Application Pending]

This invention relates to a method for welding thin sheet metal members by the simultaneous bonding and shaping into an essentially planar configuration without the addition of a bonding material. This is accomplished by explosively welding overlapped sheets while simultaneously bending them such that the major portions of the two sheets are left in a single plane. The method furnishes a simple and economical method of welding thin sheet aluminum and titanium with bonds which exhibit the strength of the parent metal.



IMPROVED NARROW BAND FM SYSTEM FOR VOICE COMMUNICATIONS

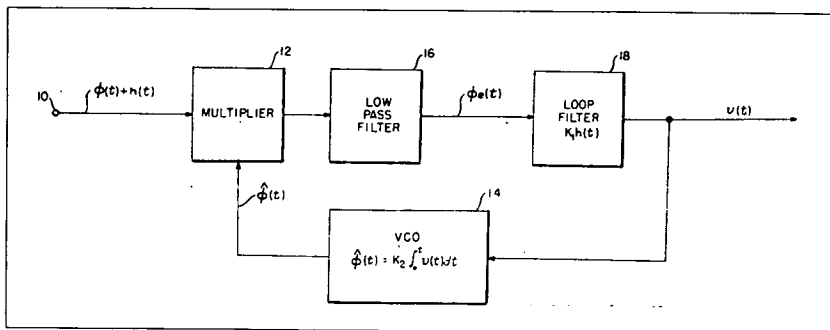
NASA Case No. GSC-11261-1

Canada, Great Britain, France,
West Germany, Japan, Australia,
Italy

Address inquiries to:
Goddard Space Flight Center
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Mail Code: 204
Greenbelt, MD 20771
U.S.A.

[Corresponding U.S. Patent—Application Pending]

The Narrow Band FM transmitter transmits voice signals on a FM carrier signal. The transmitter includes preemphasis for flattening the frequency spectrum. The receiver includes a demodulator for demodulating the FM carrier with decreasing band width as a function of the carrier strength. Limiting means are employed for decreasing the carrier strength as the incoming carrier-to-noise ratio decreases and a deemphasis circuit for restoring the frequency spectrum of the original voice signal.



LONG RANGE LASER TRAVERSING SYSTEM

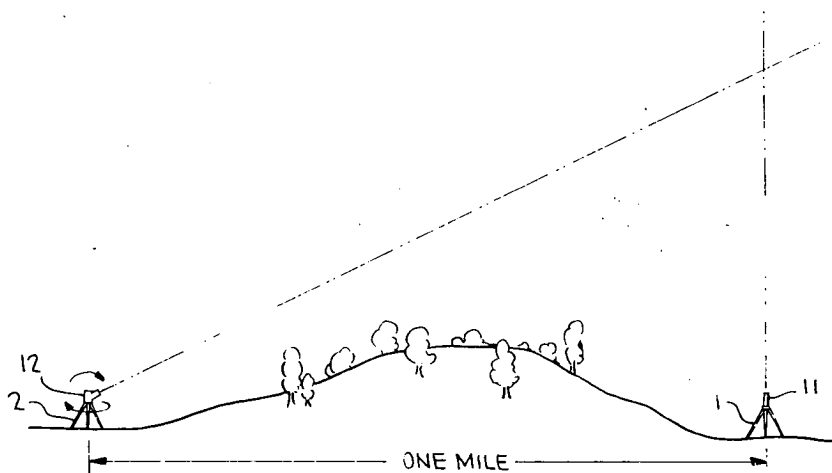
NASA Case No. GSC-11262-1

Canada, Great Britain, France,
West Germany, Japan, Australia,
Sweden

Address inquiries to:
Goddard Space Flight Center
Attn: Patent Counsel
Mail Code: 204
Greenbelt, MD 20771
U.S.A.

[Corresponding to U. S. Patent No. 3,804,525]

The relative azimuth bearing between first and second space terrestrial points (which may be obscured from each other by intervening terrain) is measured by placing at one of the points a laser source for projecting a collimated beam upward in the vertical plane. The collimated laser beam is detected at the second point by positioning the optical axis of a receiving instrument for the laser beam in such a manner that the beam intercepts the optical axis. In response to the optical axis intercepting the beam, the beam is deflected into two different ray paths by a beam splitter having an apex located on the optical axis. The energy in the ray paths is detected by separate photoresponsive elements that drive logic networks.



DUAL CYCLE AIRCRAFT TURBINE ENGINE

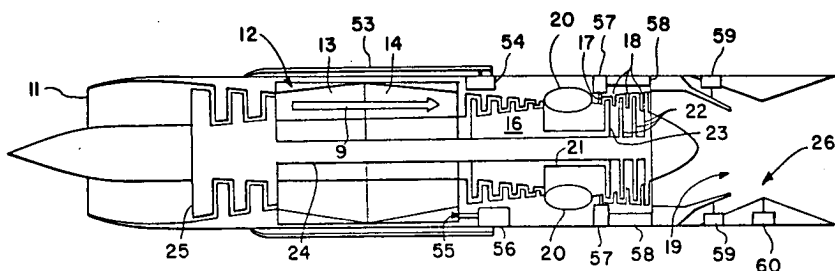
NASA Case No. LAR-11310-1

Canada, France, Germany,
Great Britain, Italy,
Japan

Address inquiries to:
Langley Research Center
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Hampton, VA 23665
U.S.A.

[Corresponding U.S. Patent – Application Pending]

This invention describes a method and apparatus applicable to jet engines for improving operating efficiency over broad ranges of flight conditions and for reducing engine noise output in take-off and landing by controlling the airflow entering and exiting the engines. A turbojet engine apparatus is described which operates efficiently at both subsonic and supersonic speeds and a method is described which enables a turbofan with an associated satellite turbojet or turbofan to operate more efficiently at both subsonic and supersonic speeds. In both cases, take-off and landing noise is reduced substantially. The apparatus consists essentially of arranging for two separate portions of an engine to act upon one airstream or, alternately, to operate on independent airstreams.



AMPLITUDE STEERED ANTENNA ARRAY

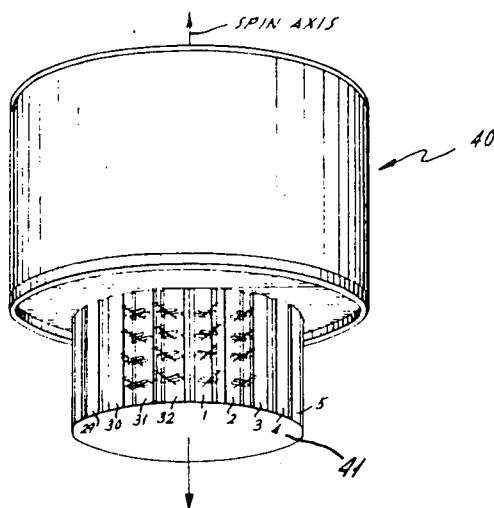
NASA Case No. GSC-11446

Canada, France, Germany,
Great Britain, Japan,
Netherlands

Address inquiries to:
Goddard Space Flight Center
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Mail Code: 204
Greenbelt, MD 20771
U.S.A.

[Corresponding to U.S. Patent No. 3,806,932]

A spin stabilized satellite has an electronically despun antenna array comprising a multiplicity of peripheral antenna elements. A high gain energy beam is established by connecting a suitable fraction or array of the elements in phase. The beam is steered or caused to scan by switching elements in sequence into one end of the array as elements at the other end of the array are switched out. The switching transients normally associated with such steering are avoided by an amplitude control system. Instead of abruptly switching from one element to the next, a fixed value of power is gradually transferred from the element at the trailing edge of the array to the element next to the leading edge. Thus as the satellite rotates, power is reduced on one element and power is increased on the other element thereby avoiding switching transients and maintaining constant total array power at all times.



RECORDER/PROCESSOR APPARATUS

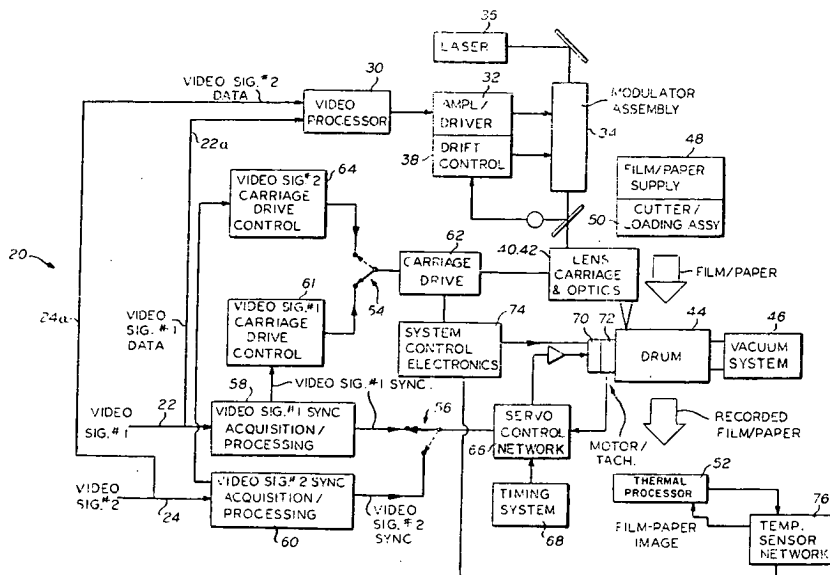
NASA Case No. GSC-11553

Japan

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Mail Code: 204
Greenbelt, MD 20771
U.S.A.

[Corresponding to U.S. Patent No. 3,781,902]

This is an apparatus for recording and thermally processing data. A laser beam, modulated by a video signal generates a raster so as to expose a latent image of the input information on a storage medium. A rotating drum in conjunction with an incrementally driven lens carriage associated with the laser optical system provides the raster generation. The drum is automatically loaded with the storage medium from a supply means and automatically unloaded to a thermal processor upon completion of recording. The latent image is processed by the controlled application of heat so as to produce an actual displayable image corresponding to the data input at the output of the apparatus.



MILLIMETER WAVE PUMPED PARAMETRIC AMPLIFIER

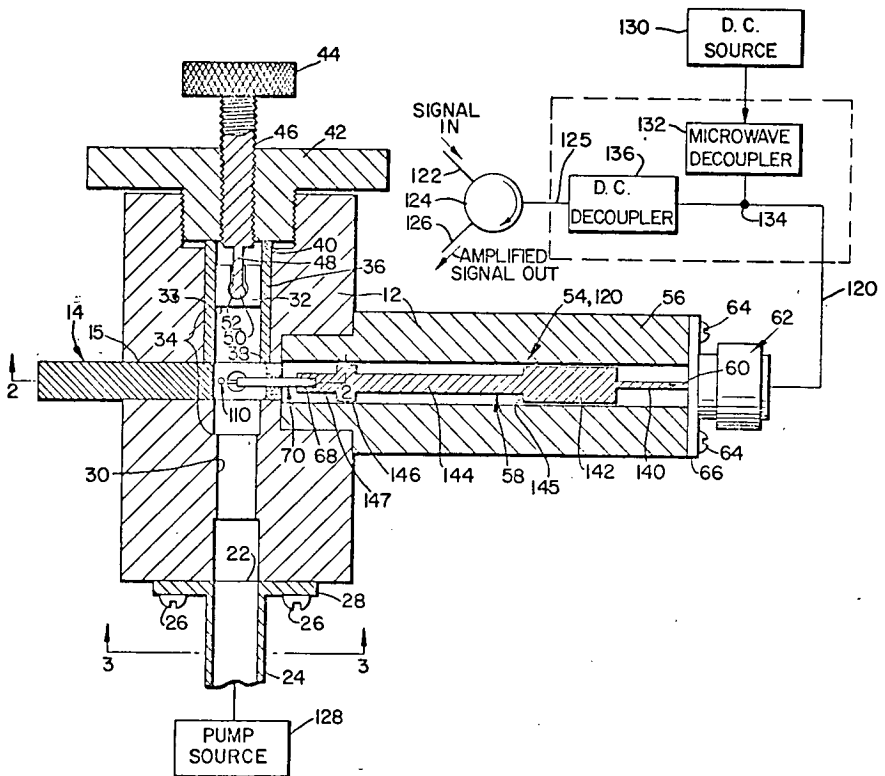
NASA Case No. GSC-11617

Canada, France, Germany,
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[Corresponding U.S. Patent – Application Pending]

The present invention is directed to a new parametric amplifier structure which exhibits a large gain-bandwidth product and low noise characteristics without cryogenic cooling. In addition, higher idler frequencies are attained and which are easily adjustable in resonant frequency. The amplifier includes a stacked pair of uncased varactor diode chips within a waveguide channel, which chips are stacked in a predetermined direction.



ELECTRON BEAM CONTROLLER

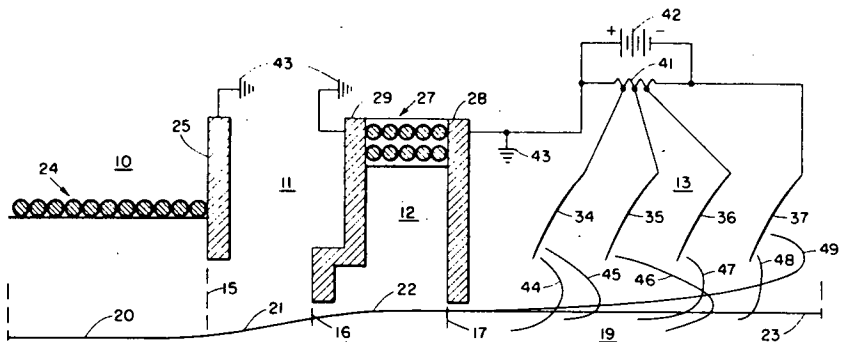
NASA Case No. LEW-11617-1

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France, Great Britain,
Germany, Japan, Italy,
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[Corresponding to U.S. Patent No. 3,764,850]

A magnet applies a magnetic field of predetermined intensity and shape to a spent electron beam over an axial distance having a predetermined relationship to the frequency of operation of a utilization device which has extracted energy from the electron beam and at a predetermined axial distance after the beam has left the magnetic field of the utilization device and entered the beam expansion region and beam stabilization region. The stabilizing magnetic field is terminated abruptly before the electron beam enters a collector apparatus.



WINGTIP VORTEX DISSIPATOR FOR AIRCRAFT

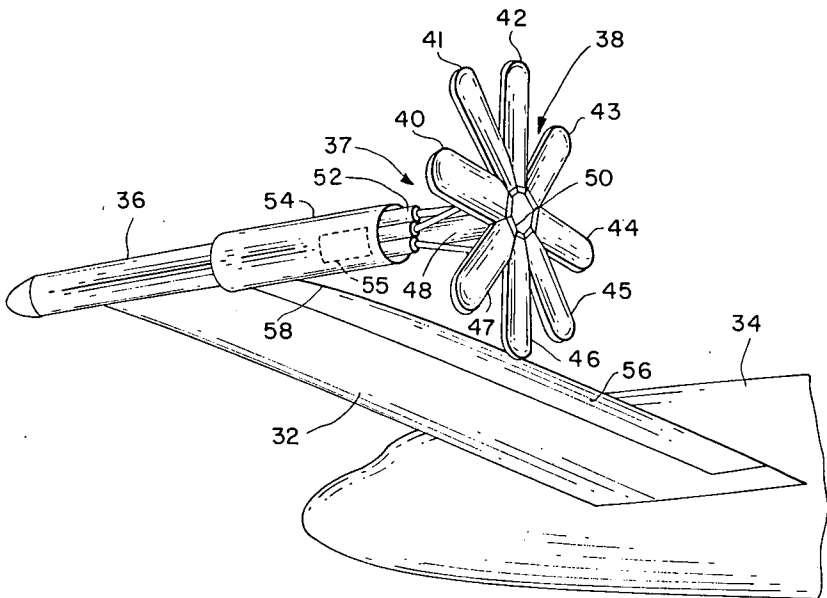
NASA Case No. LAR-11645

Canada, Japan, Germany

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[Corresponding U.S. Patent – Application Pending]

The lift-induced wingtip vortex associated with large jet aircraft has become a major problem to the air traffic controller as well as an unseen hazard to smaller aircraft. In this invention, a means for attenuating this potentially dangerous wingtip vortex is disclosed which consists of a drogue device attached downstream of the wingtip which creates a positive pressure gradient just downstream from the wing. The positive pressure forces a break up of the rotational air flow of the vortex.



VOLTAGE CONTROLLED VARIABLE POWER DIVIDER

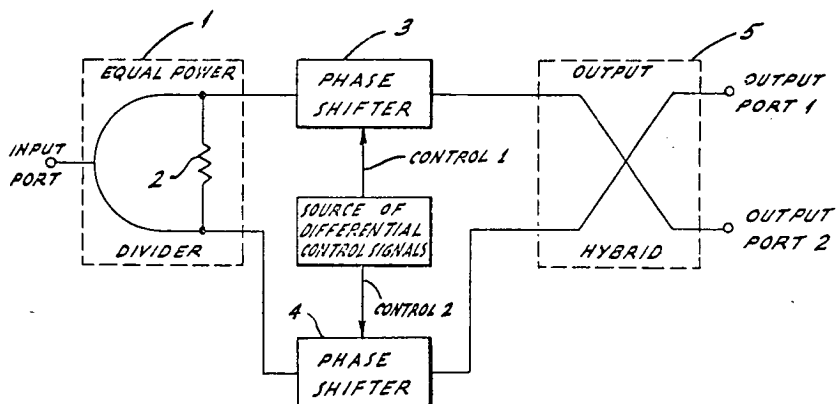
NASA Case No. GSC-11659

Canada, Great Britain,
France, Germany, Japan,
Netherlands

Address inquiries to:
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Greenbelt, MD 20771
U.S.A.

[Corresponding to U.S. Patent No. 3,769,610]

In the voltage controlled variable power divider of the invention, the total output power equals the input power and both outputs have constant and equal phase. The applied power is split into two channels, each of which contains a variable phase shifter. The channels are combined in a 90-degree hybrid coupler so that the relative amplitude in the hybrid outputs is a function of the phase of the hybrid input signals. The phase shifters are voltage driven in opposition so that constant phase is achieved for all output power division ratios.



TWISTED MULTIFILAMENT SUPERCONDUCTOR

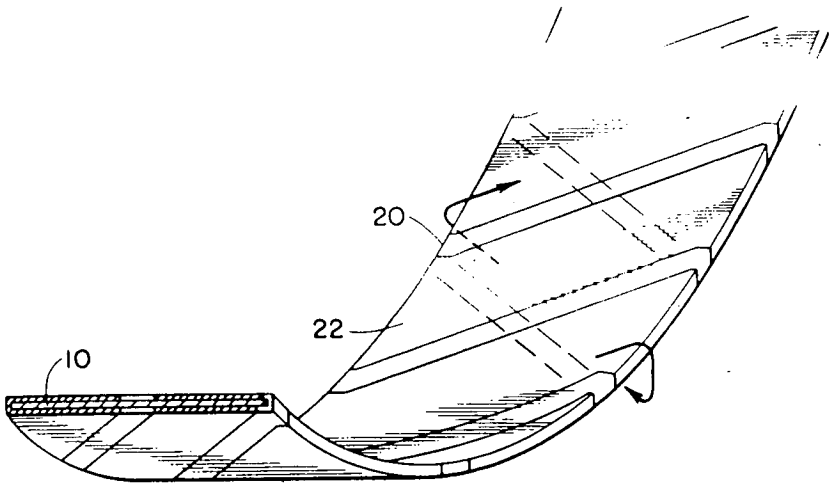
NASA Case No. LEW-11726-1

Canada, France, Japan,
Great Britain, Germany,
Netherlands

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[Corresponding to U.S. Patent No. 3,737,824]

Masking selected portions of a ribbon and forming an inter-metallic compounds on the unmasked portions by a controlled diffusion reaction produces a twisted filamentary structure. The masking material prohibits the formation of superconductive material on predetermined areas of the substrate.



DUALLY MODE-LOCKED Nd:YAG LASER

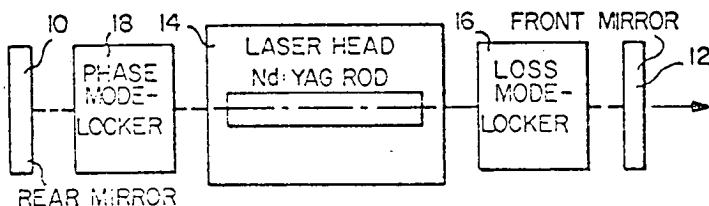
NASA Case No. GSC-11746-1

Canada, France, Germany,
Great Britain, Japan,
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Address inquiries to:
Goddard Space Flight Center
Attn: Patent Counsel
Mail Code: 204
Greenbelt, MD 20771
U.S.A.

[Corresponding U.S. Patent – Application Pending]

A need exists in laser technology whereby stable mode-locking can be achieved for a pulsed laser system which is simple and which avoids other known disadvantages. The present invention meets these requirements and includes a pair of partially reflecting mirrors forming the laser cavity. The dual mode-locking elements will pass timed pulses without being extinguished.



DISH ANTENNA HAVING SWITCHABLE BEAMWIDTH

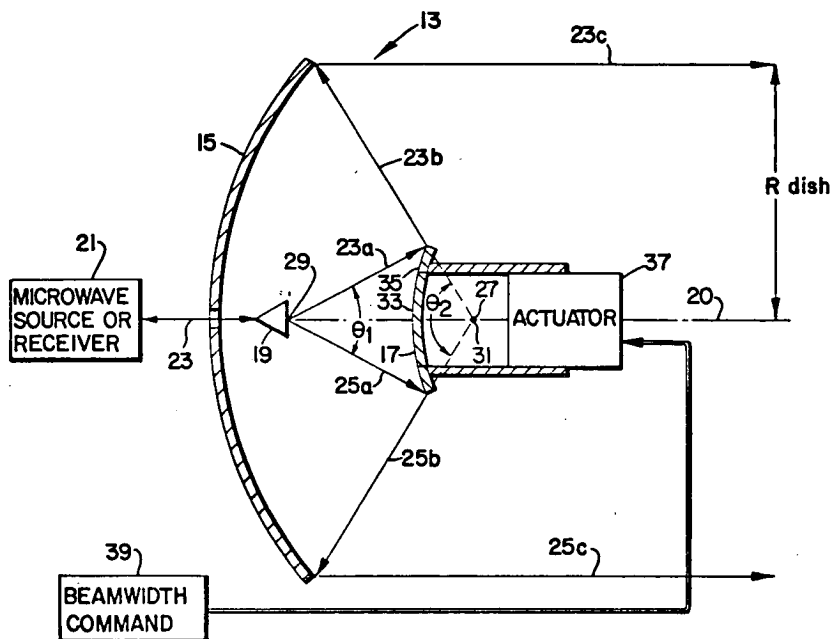
NASA Case No. GSC-11760-1

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Great Britain, Japan,
Netherlands**

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Attn: Patent Counsel
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Greenbelt, MD 20771
U.S.A.

[Corresponding U.S. Patent – Application Pending]

The need frequently arises to augment narrow beamwidth transmitting and/or receiving antennas with a wide beamwidth "acquisition" mode. The present invention is a switchable beamwidth antenna employing a common main reflecting dish operable in at least two different beamwidth modes. It includes a concave parabolic main reflecting dish with a central circular region and a surrounding coaxial annular region. The central region of the main dish can be excited for wide beamwidth or the entire dish for narrow beamwidth.



ELECTROSTATICALLY CONTROLLED HEAT SHUTTER

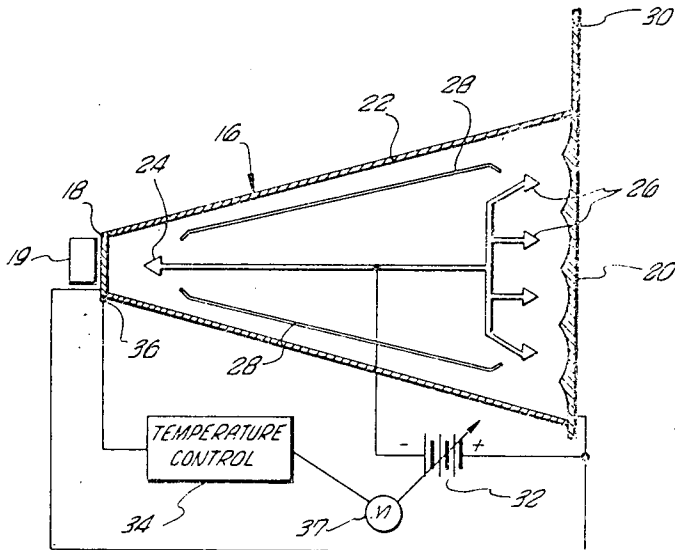
NASA CASE No. NPO-11942

Australia, Canada, France,
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[Corresponding to U.S. Patent No. 3,763, 928]

A heat transfer assembly for conducting thermal energy includes a hermetically sealed container enclosing a quantity of inert gas such as nitrogen. Two opposed walls of the container have high thermal conducting characteristics while the connecting walls have low thermal conducting characteristics. Electrodes are positioned adjacent the high thermal conducting walls and biased relative to the conducting walls to a corona potential for creating an ionic gas wind which must contact the conducting walls to be neutralized. The contact of the gas molecules permits the maximum thermal energy transfer between the walls. Baffles are positioned adjacent the electrodes to regulate gas flow between the high thermal conducting surfaces.



OPHTHALMIC LIQUEFACTION PUMP

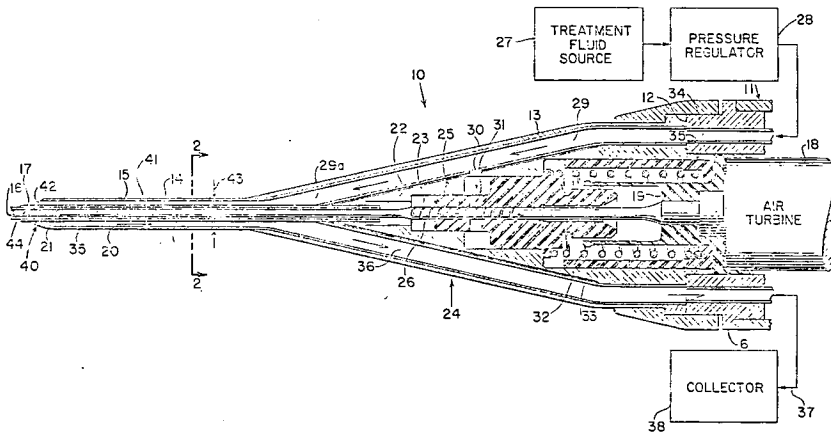
NASA Case No. LEW-12051

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Netherlands, Germany, India,
France

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[Corresponding U.S. Patent – Application Pending]

A surgical tissue macerating and removal tool is disclosed wherein a rotating member having a cutting tip is utilized. When the instrument is to be used in an eye, a treatment fluid is supplied to the operative site and a first pump is provided to evacuate macerated material and treatment fluid from the eye. A second pump means is provided on the rotating member to provide a counter flow of treatment fluid into the space between the rotating member and the support tube. The second pump may provide additional support for the rotating member. Means is also provided for axially positioning rotating member to increase or decrease cutting action.



ANTI-FOG COMPOSITION

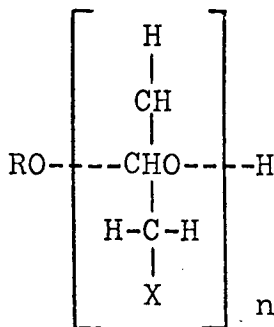
NASA Case No. MSC-13530-2

Australia, Belgium, Canada,
France, Germany, Great Britain,
Netherlands, Italy, Japan,
Sweden, Switzerland

Address inquiries to:
Manned Spacecraft Center
Attn: Patent Counsel
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Houston, TX 77058
U.S.A.

[Corresponding U.S. Patent—Application Pending]

The development and chemical composition of a substance to prevent fogging of windows, mirrors, glasses, space suit visors, and similar optical equipment are discussed. The materials consists of an alkyl glycerol sulfonate, water, and a time extender in the form of an oil. The materials is expected to prevent fogging of visual surfaces for periods of five hours or more during maximum metabolic loads.



MODIFICATION OF THE PHYSICAL PROPERTIES OF FREEZE-DRIED RICE

NASA Case No. MSC-13540-1

Great Britain, France, Canada,
Japan, Australia, Switzerland,
India, Korea

Address inquiries to:
Manned Spacecraft Center
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Houston, TX 77058
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[Corresponding to U.S. Patent No. 3,692,533]

The method steps include first cooking rice over a low simmering heat until it is tender and edible. Then it is frozen and thawed for two complete cycles. Thereafter, the rice is again frozen and freeze dried in a vacuum sufficient to remove water from the rice by sublimation. Rehydration is accomplished by placing the rice in water at an elevated temperature and normally requires only a minute or so. The cycle of first freezing and then thawing appears to change grain porosity and permits easy and rapid sublimation of the water vapor.

AIR CUSHION LIFT PAD

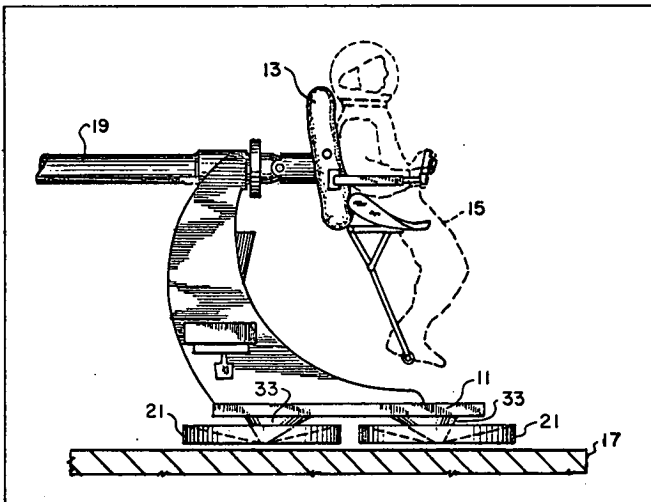
NASA Case No. MFS-14685

Canada,

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Attn: Patent Counsel
Mail Code: A&PS-PAT
Huntsville, AL 35812
U.S.A.

[Corresponding to U. S. Patent No. 3,534,826]

An air cushion lift pad has been developed which utilizes an air cushion of pressurized air to support a device above a surface. The pad includes an upper wall which slopes upwardly from a center portion. Should the pad tend to tilt, the vertical lift force component acting on the inner wall will tend to decrease on the high side and increase on the low side, thereby producing a torque tending to stabilize the pad along the horizontal. A plurality of pads may be used and the design achieves a very stable device with no flutter, vibration, heaving or pitching. The lift pad may be employed to support an object, vehicle, etc. above a surface. Although the surface may be rough or unprepared, stability is achieved.



PROCESS AND APPARATUS FOR MAKING DIAMONDS

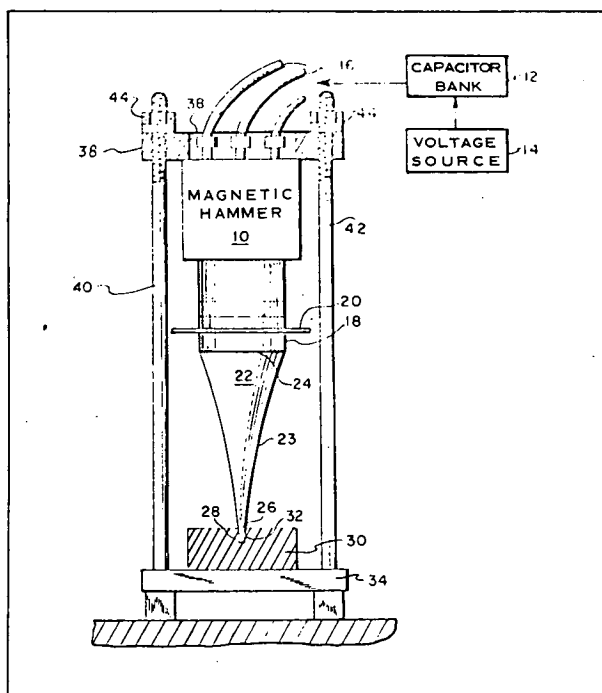
NASA Case No. MFS-20698

Canada, France,
Japan, Great Britain,
West Germany

Address inquiries to:
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Mail Code: A&PS-PAT
Huntsville, AL 35812
U.S.A.

[Corresponding to U.S. Patent No. 3,632,242]

Diamonds of industrial grade may be fabricated from graphite by this simple but effective apparatus. An exponential horn is vertically positioned with its small end in a graphite receiving pocket. A magnetic hammer above the horn, generates a shock wave in the exponential horn and due to the horn geometry, the velocity of the shock wave is amplified and the shock wave energy concentrated so that all of the energy arrives simultaneously at the small end of the horn. This energy is transferred to the graphite in the anvil pocket and results in pressure and temperature levels that causes the graphite to be transformed, in part, to diamonds.



METHOD AND APPARATUS FOR NON-DESTRUCTIVE TESTING

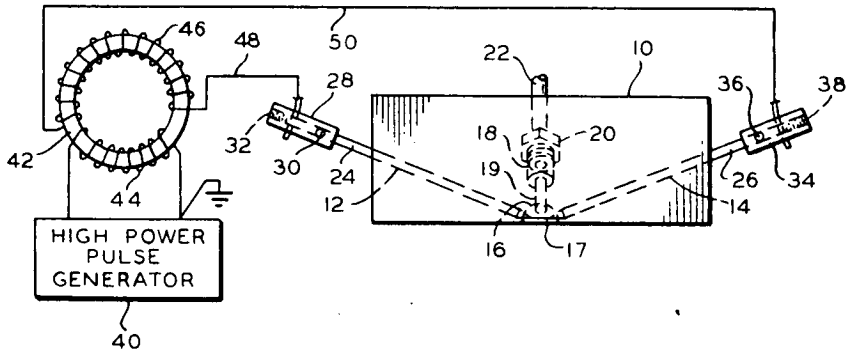
NASA Case No. MFS-21233

Australia, Belgium, Canada,
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Germany, Italy, Japan,
Sweden, Netherlands,
Switzerland

Address inquiries to:
Marshall Space Flight Center
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Mail Code: A&PS-PAT
Huntsville, AL 35812
U.S.A.

[Corresponding to U.S. Patent No. 3,782,177]

A high voltage is applied to an arc gap adjacent to a test specimen to develop a succession of high-frequency arc discharges. Those high frequency arc discharges generate pulses of ultrasonic energy within the test specimen without requiring the arc discharges to contact that test specimen and without requiring a coupling medium between those arc discharges and that test specimen. Those pulses can be used for detection of flaws, for measurement of certain properties of the test specimen, and for measurement of stresses within that test specimen.



GRAPHITE-REINFORCED ALUMINUM COMPOSITE AND METHOD OF PREPARING THE SAME

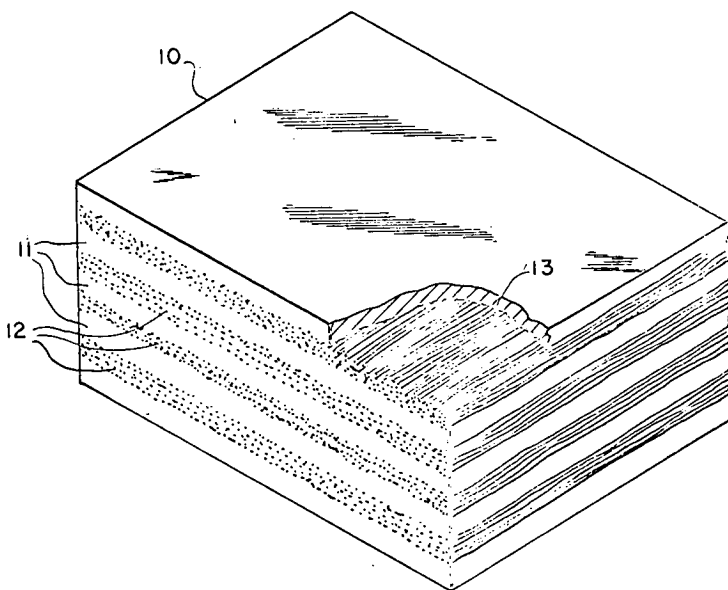
NASA Case No. MFS-21077

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Italy, Japan

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Mail Code: A&PS-PAT
Huntsville, AL 35812
U.S.A.

[Corresponding U.S. Patent—Application Pending]

Graphite-reinforced aluminum composite material is prepared by coating high strength, high modulus, and low density graphite fiber with nickel, aligning the coated fibers between and in contact with aluminum sheets in a stacked array, and bonding the array into an integral body by application of heat and pressure. The resulting diffusion-bonded composite shows favorable mechanical properties, the graphite fibers remaining intact during the preparation process. Damaging reactions at the graphite surface are prevented by the protective nickel coating. The graphite-reinforced material prepared by the above method can be subjected to shaping or forming operations without breaking the fibers.



**MICROWAVE POWER TRANSMISSION SYSTEM
WHEREIN LEVEL OF TRANSMITTED POWER IS
CONTROLLED BY REFLECTIONS FROM RECEIVER**

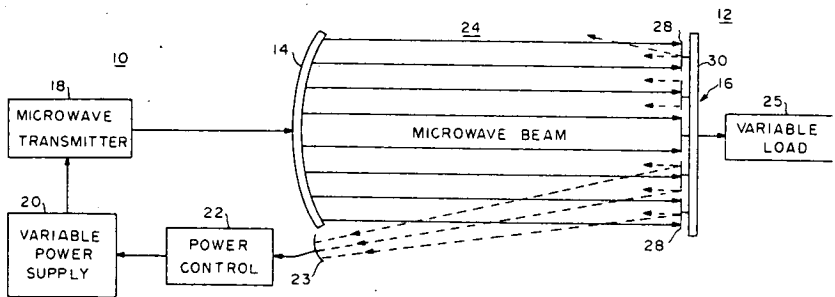
NASA Case No. MFS-21470-1

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Netherlands**

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Marshall Space Flight Center
Attn: Patent Counsel
Mail Code: A&PS-PAT
Huntsville, AL 35812
U.S.A.

[Corresponding to U.S. Patent No. 3,795,910]

This invention is a microwave, wireless, power transmission system in which the transmitted power level is adjusted to correspond with power required at a remote receiving station in which deviations in power load produce an antenna impedance mismatch causing variations in energy reflected by the power receiving antenna employed by the receiving station. The variations in reflected energy are sensed by a receiving antenna at the transmitting station and used to control the output power of a power transmitter.



REFRACTORY PORCELAIN ENAMEL PASSIVE CONTROL COATING FOR HIGH TEMPERATURE ALLOYS

NASA Case No. MFS-22324

Australia, Canada, France,
Germany, Great Britain,
Japan, Italy, Israel,
Netherlands

Address inquiries to:

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U.S.A.

[Corresponding U.S. Patent – Application Pending]

Many coating materials have been developed in the space program. This coating is an excellent thermal coating for exposed surfaces. These coatings have low solar absorptance and a high emittance to provide effective protection from solar radiation, reentry heating, dust, salt spray, etc. The coating of this invention meets these requirements and is easily cleanable and will maintain its physical integrity after severe thermal cycling. It is made up of a high-refractory-content borosilicate glass frit containing zirconium oxide, lithium fluoride, alkali metal and-alkaline earth oxide-flux, zinc oxide and a submicron disperse phase of cubic-stabilized zirconium oxide.



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—NATIONAL AERONAUTICS AND SPACE ACT OF 1958

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